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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

AN ADDRESS on Environment and Health. By CHARLES P. CHILDE, F.R.C.S., M.R.C.P. 155

ORIGINAL ARTICLES.

Primary and Secondary Resistance to the Induction of Cancer. By J. A. MURRAY, M.I , B.Sc.—(*Illustrated*) 159

The Immediate Prognosis in Nephritis, with Some Remarks on Uræmia. By O. L. V. DE WESSELOW, M.B., F.R.C.P. 163

Secondary Anæmia in Infancy: A Record of Some Clinical Observations. By HELEN M. M. MACKAY, M.D., M.R.C.P. 165

Insulin. By Prof. J. J. R. MACLEOD, F.R.S., M.B., Ch.B. 198

Typhus Fever Epidemic Among the Greek Refugees. By Sir PATRICK HEHIR, K.C.I.E., C.B., C.M.G., M.D., F.R.C.S., F.R.C.P.—(*To be continued*) 209

REVIEWS AND NOTICES OF BOOKS.

A Text-Book of Therapeutics, Including the Essentials of Pharmacology and Materia Medica. By Prof. A. A. Stevens, A.M., M.D. 168

Multiple Sclerosis (Disseminated Sclerosis). Vol. II. of the Series of Investigations and Reports of the Association for Research in Nervous and Mental Diseases ... 168

The Common Neuroses: Their Treatment by Psychotherapy. By T. A. Ross, M.D., F.R.C.P.E.. 168

Medical Diagnosis. By Prof. Charles Lyman Greene, M.D. 169

Traité pratique de cystoscopie et de cathétérisme urétéral. By Prof. G. Marion and Prof. M. Heitz-Boyer 169

Generalised Pain. Part II. of the Clinical Symptomatology of Internal Diseases. By Prof. Dr. Norbert Ortner. Translated by Francis J. Rebman. Introduction by Thomas Webster Edgar, M.D. 169

Selected Papers and Addresses. By Prof. William Williams Keen, M.D., LL.D. 169

Exploration clinique et diagnostic chirurgical. By Prof. Felix Lejars .. 170

The Evolution of Man. A Series of Lectures delivered before the Yale Chapter of the Sigma Xi during the Academic Year 1921–22. Edited by George Alfred Baitsell. 170

Topographische Anatomie dringlicher Operationen. By J. Tandler 170

Les désanglés du ventre; Maladies par relâchement des parois et organes abdominaux. By Dr. Chauvois 170

Grundriss der gesamten Chirurgie. By Prof. Dr. Erich Sonntag 170

LEADING ARTICLES.

THE ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION 177

CANCER FACTS AND CANCER THEORIES..... 177

CHILD MORTALITY IN SCOTLAND 178

ANNOTATIONS.

The Museum of the College of Surgeons 179

New Director-General of the Naval Medical Service 179

Outbreaks of Septic Sore-throat Spread by Milk.. 179

The Centenary of the Edinburgh Veterinary College 180

An Epidemic of Erythema Nodosum 180

Sterilisation or Segregation 181

Linitis Plastica 181

"Leaving it to Nature".. 182

Ophthalmological Training for Medical Students ... 182

Eleventh International Physiological Congress, 1923 183

The Administration of the Vaccination Acts 183

SPECIAL ARTICLES.

British Medical Association: Annual Meeting at Portsmouth: Civic Welcome.—Representative Meetings, July 20th and 21st.—Public Health Policy of the B.M.A.—Hospital Policy of the B.M.A. 185

Sixth Congress of the International Society of Surgery—(*Concluded*) .. 171

The Voluntary Hospitals During 1922 190

A Year's Work of the Scottish Board of Health 191

National Association for the Prevention of Tuberculosis—(*Concluded*).... 192

Paris: Medical Centre for the Service de la Navigation Aérienne.—International Congress for Social Hygiene Propaganda .. 194

MODERN TECHNIQUE IN TREATMENT.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

XXX.—The Treatment of the Hypertrophied Prostate. By Prof. CHARLES A. PANNETT, M.D., B.S., F.R.C.S. 184

THE SERVICES.

Royal Naval Medical Service: New Director-General.—Royal Army Medical Corps 194

PUBLIC HEALTH SERVICES.

Reports of Medical Officers of Health: Carlisle.—Worcester.—Winchester.—Northampton.—Torquay.—Heston and Isleworth.—Hendon.—Ilford.—Spenborough.—Swinton and Pendlebury.—Tottenham.—Willesden 195

OBITUARY.

William Ford Robertson, M.D., C.M. 196

CORRESPONDENCE.

Lymphocytosis from Infections (Dr. H. Letheby Tidy) 197

Schistosomum Mansoni in South Africa (Dr. F. G. Cawston) 197

INDEX NOTICE.

THE LANCET, Vol. I., 1923 176

MEDICAL NEWS.

University of London 205

University of Manchester . 205

University of Paris 205

Royal Society of Medicine 176

Lancashire Insurance Committee and the Spahlinger Treatment 197

King's College Hospital Festival Dinner 204

Royal Sanitary Institute . 205

Royal College of Physicians, Edinburgh 205

Payment of Panel Doctors in Cheshire 205

Scottish Board of Health: Precautions against Small-pox 205

Regulations for Labelling Dried Milk 205

People's League of Health 205

PARLIAMENTARY INTELLIGENCE.

House of Lords: Smoke Abatement.—Therapeutic Substances Bill.—Sale of Liquor to Children 206

House of Commons: Grants to Local Authorities.—Coroners and Juries.—Visit of Distinguished Russian Scientist.—Milk-feeding Experiments.—Poor-law Officers' Superannuation.—Houses under the New Bill.—Small-pox Commissioners—Medical Boards and Final Awards.—Allowances for Home Treatment.—Medical Commissioner and the Welsh Language.—Dental Inspection in Wales.—Panel Doctors and Treatment Allowances.—Insane Prisoners.—Nurses and Registration.—Small-pox at Brockworth Aerodrome.—Mortality from Small-pox.—Pernicious Anæmia.—The Army Medical Service.—Small-pox at Gloucester Aerodrome 206

NOTES, COMMENTS, AND ABSTRACTS.

A Directory of Bart.'s Men 210

A Book for Laymen on Heart Failure 210

Appointments 208

Vacancies..... 208

Births, Marriages, Deaths. 208

Medical Diary 210

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An Address

[ABRIDGED]

ON

ENVIRONMENT AND HEALTH.

Being the Presidential Address delivered at the Annual Meeting of the British Medical Association in Portsmouth on July 24th, 1923,

BY CHARLES P. CHILDE, F.R.C.S. ENG., M.R.C.P. EDIN.,

SENIOR SURGEON, ROYAL PORTSMOUTH HOSPITAL.

[AFTER welcoming the members of the Association and calling attention to the previous meeting held at Portsmouth in 1899, Mr. Childe commented on the past history and present development of the town. He proceeded :—]

During the past fifty years medicine has done infinitely more to constitute itself a science than in all the previous ages. This has been mainly due to the flood of light thrown upon the specific ætiology of many diseases by the epoch-making discoveries of Pasteur, and the stimulus those discoveries have given to other workers. Previous to this almost nothing was known of the agencies concerned in the onset of any diseases, except those of purely mechanical origin. Of such widespread and prevalent disorders as the surgical infections, enteric fever, tuberculosis, diphtheria, syphilis, malarial fever, pneumonia, and many others, the causes were entirely unknown, the speculations and theories as to their origins were various—"Quot homines, tot sententiæ"—and their treatment was entirely empirical. All disease was a mystery. A great deal of it is no longer a mystery. Approximately one-half of the diseases with which we are acquainted are now known to have their origin in infection by living organisms belonging either to the plant or to the animal kingdom, and the probability is that the list is not yet nearly exhausted. Besides this, it has been computed that nearly half the deaths that occur annually are traceable to the same cause.

With the emergence of medicine from the mysterious no less a revolution has occurred in the practitioner of medicine. While a good bedside manner is still a valuable asset, and will so remain in so far as it connotes a sympathetic and human attitude towards the sick and suffering, and while from a business point of view a good shop-front no doubt has its value, no longer are the doctor's brains assessed by the sheen of his tall hat or the length of his frock-coat. Like medicine, the doctor has become less mysterious, less aloof from and superior to his fellow men. Knowing more he has become less omniscient. Standing on surer ground he has become less pretentious. The medical priest-craft, reminiscent of a time when the medicine-man was more priest than physician, and more charlatan than either, has disappeared or is disappearing. This is all to the good, and tends to a more enlightened confidence between doctor and patient.

Again, so much relating to the discoveries and advances in medicine nowadays finds its way into the lay press that the general public has, apart from its technical aspects, a broad knowledge of the progress medicine is making, and is alive to its new developments. This is again to the good. A strong opposition is always an incentive to good government. The advent of a wideawake and informed public tends to keep the profession up to the mark. It adds nothing to the dignity, not to mention the security, of the doctor to be questioned by his patient on some new treatment or phase of a disease he has never heard of, but with which he finds his patient has more than a bowing acquaintance.

It was a natural sequence of the elucidation of the causative agent in many of the infectious diseases that scientific effort should be directed to two main objectives: first, to the discovery of means of producing an artificial immunity similar to the active natural immunity which it was a matter of common knowledge resulted after recovery from an attack of many of them; secondly, to producing immunity reactions which should have the effect of neutralising the toxic products of the invading organisms during an attack. In both of these directions remarkable results have been achieved, both by what is known as vaccine prophylaxis and therapy, and antiserum prophylaxis and therapy.

Successes in Prophylaxis.

The most completely successful example of *vaccine prophylaxis* is that of vaccination against small-pox, introduced by Jenner in 1798. This remarkable discovery was the result of shrewd observation and logical deduction. It was, nevertheless, empirical; the principle on which it rested was not understood until the work of Pasteur more than half a century later. In countries where vaccination is twice practised, small-pox has practically ceased to exist, and its sporadic outbreak from time to time is a warning to the public of neglect of the means to prevent it. In typhoid and paratyphoid fever, by measures along the same lines, immunity lasting for a period of one or two years can be secured, and has greatly reduced the incidence of these diseases both among civilians and soldiers.

Again, the mortality from rabies has been reduced from 16 per cent. to a fraction of 1 per cent., an active immunity being capable of being produced here after infection has already taken place, owing to the lengthy incubation period of the disease. *Vaccine therapy*—that is, the production of active immunity after attack by a known micro-organism—so ably advocated by our own countryman, Sir Almroth Wright, has given very beneficial results in staphylococcus infections, skin affections, &c. Of *antiserum prophylaxis* the best example is that obtained in tetanus. The mortality following Fourth of July injuries in America has ceased to exist owing to its use, and no less life-saving results were obtained by the same means in the Great War. The most familiar and the most successful instance of *antiserum therapy* is that of diphtheria, which has reduced the mortality from 40 to 10 per cent., and, if used on the first day of the disease, to almost *nil*.

These are veritable triumphs of strictly scientific medicine. In other diseases more or less success has been achieved. But closer investigation has shown that there are many factors requiring elucidation which undoubtedly influence the result—such as choice of route, recognition of different types of the same disease, &c.—and it will certainly take many years of patient endeavour before the ultimate possible results in securing immunity are obtained. In many instances prophylaxis or cure has eluded us, and the results have proved disappointing. The above may be termed the result of scientific effort, either preventive or curative, directed towards the individual.

There are other diseases, which have been attacked from a totally different angle—namely, by studying and combating conditions which favour the growth, dissemination, and virulence of the infecting organism, by so altering environment and increasing natural resistance, whatever that may precisely mean, that many diseases which have been very prevalent and very fatal in the past have almost or entirely ceased to exist, and are no longer of any account. Let me give you one or two very familiar examples.

Take typhus fever. During the last century it prevailed in all the large cities of Great Britain and the Continent. So late as 1875 in England and Wales there were 1499 deaths from the disease. During recent years the name "typhus" has seldom appeared in the Registrar-General's returns. It is a disease essentially dependent on filth and overcrowding. Bad as these conditions are even now in our large industrial centres, the disappearance of this disease is evidence of an improvement as compared with half a century ago—an improvement in environment and an improvement in natural resistance, owing to better living conditions, sufficient to have caused its disappearance altogether.

After the peace of 1815, following a long and exhausting war, when the economic position was somewhat similar to that existing at the present time, typhus fever and relapsing fever, which occurs under similar conditions to typhus, were rife in England and Ireland. No such catastrophe has accompanied the economic depression following the last Great War.

Take, again, typhoid fever. It is a water-borne disease. Bad drainage and a contaminated water-supply are the factors favouring its distribution. Its prevalence or the reverse in a community is the measure of their sanitary intelligence and enterprise. Filth, overcrowding, and bad ventilation are factors conducing to its prevalence, by lowering natural resistance. The marked decline in typhoid fever is again the result of an improvement in environment. Typhoid fever has declined from 375 per million in 1870 to 25 per million at the present time. In Portsmouth typhoid fever, quite prevalent in the town when I came here 30 years ago, has almost ceased to exist.

These are examples of diseases which have disappeared, or are disappearing, owing to action following an intelligent study and comprehension of the conditions and environment favouring their distribution.

Now, "environment" is obviously a very wide term. It embraces living conditions generally. The amount and quality of food and water, the presence or absence of domestic hygiene, the supply or not of good drainage, the furnishing or not of healthy conditions in factory and workshop, the prevalence or not of smoke and fog, the provision or not of adequate open spaces, playgrounds, and recreation grounds, access or not to sound education—these and many others are all factors in environment. And it is satisfactory to note that these matters are receiving from governments and local authorities some of the attention which all of them deserve. But I propose to-night to consider for a few moments the special environmental factors governing the slum areas of our great industrial centres—the lack of fresh air and sunlight, and the cramped and penalising conditions to health, both moral and physical, owing to overcrowding; and to inquire what bearing these factors have upon four out of five of the most formidable endemic scourges which afflict all northern civilised peoples to-day.

THE BEARING OF ENVIRONMENTAL FACTORS ON DIFFERENT DISEASES.

The five scourges I allude to are cancer, tuberculosis, rickets, venereal disease, and alcoholism. Tuberculosis and rickets account for most of the cripples we see about us; cancer, tuberculosis, venereal disease, and alcoholism account for most of the deaths; venereal disease and alcoholism account for most of the misery and moral degradation of our race.

Cancer.

We may dismiss cancer at once from the count. The humiliating confession must be made that we know very little about it. That it has some relation to civilised environment seems evident from the fact that it is a comparatively rare disease among primitive races, and that it is certainly making rapid headway among all civilised peoples. But of the nature of the environment favouring its activities we are in complete ignorance. It is neither foul air nor fresh air, neither hardship nor indulgence, neither poverty nor riches. Cancer like death—

> "Æquo pulsat pede pauperum tabernas,
> Regumque turres."

The only things we know about it which are worth knowing are its age-incidence, its relation to chronic irritation, and the fact that it is in its beginnings a local disease, and that therefore it can be cured by early removal in those situations where removal is possible.

This is practically all we know about cancer. I wish to make only two comments. The first is that this knowledge is not enough. In an age which has yielded secrets of so many diseases it is a point of honour with the medical profession not to rest content till this pressing problem has been solved. With the public it is not only an obligation but, from the point of view of their own interest and safety, a vital necessity to furnish the financial means of solution, and to see to it that research is not crippled or stinted by any niggardly parsimony.

The second comment I make is this: The most important fact we know about the disease is that in its beginnings it is local, and that its course is a centrifugal spread from its local point of origin. Is that knowledge anything like as productive as it might be? Undoubtedly it is not. Notwithstanding the fact that cancer has been cured over and over again by modern operation—a fact which in itself proves that it is curable—yet I believe patients come no earlier to the doctor with it than they did 30 years ago, though time is the very condition of the only cure we possess for it. Many medical men, and I confess I am one of them, are of opinion that there is considerable room for improvement in this direction. Without resort to any sensationalism some obvious steps could be taken to spread the knowledge of a few very simple facts about cancer. This would give a by no means unwarranted ray of hope to the public and would enable some of the victims of this terrible disease to apply in time to have, at all events, a chance of cure or freedom from recurrence, whichever you like to call it. This by the way.

I pass on to the consideration of the other four scourges—tuberculosis, rickets, venereal disease, and alcoholism.

Tuberculosis.

Tuberculosis first. We know the cause; it is the tubercle bacillus. We know also the prime and essential conditions of its cure; they are fresh air and sunlight. These are not only the essential conditions of its cure, but are almost the sole conditions. Those of you who are interested in the subject will have an opportunity of visiting the establishments at Alton and Hayling Island, under the able administration of Sir Henry Gauvain, where the cures are fresh air and sunlight. Dr. A. Rollier, of Leysin, read a most instructive paper at the Glasgow meeting last year, and quoted many instances of cures, and lasting cures, by these agencies in all regions of the body. It is foreign to my purpose to discuss to-night the method or supposed method of their action, or the method of their application. If, then, these agencies, fresh air and sunlight, are, as we know they are, so powerfully antagonistic to tuberculosis—whether by directly controlling the activities and virulence of the tubercle bacillus itself or by fortifying the natural resistance and so enabling the human organism to establish an immunity to it (it matters not, the result is the same)—are we not justified in the converse conclusion, that the breeding ground of this disease, the environment most encouraging to its activities, are the sunless, airless, overcrowded, and insanitary slum areas of our great cities, where houses are built 40 or more to the acre, and stand back to back, and side to side, like any jig-saw puzzle, so that fresh air and sunlight, the proved destructive agents of the tubercle bacillus, can never enter? Is it a sound economic proposition to equip and maintain, at the cost of millions of the taxpayer's money, sanatoriums for the so-called cure of tuberculosis, while we guard intact the very preserves of this disease by the exclusion of fresh air and sunlight, which cost nothing at all, and maintain in our midst a soil which can breed more tuberculosis in a week than all our sanatoriums can cure in a year? Dr. Rollier says:—

> "Housing has played an immense part in the genesis of child and adult tuberculosis; the community bears the responsibility of the waste of human lives through insanitary houses."

The industrialisation of Sweden since 1870 has been accompanied by a high adolescent mortality due to pulmonary tuberculosis. Sandberg, commenting on this, says:—

> "The cause of this difference between earlier and more recent times seems to us to be in the fact that formerly the adolescent boy and girl remained at home for a longer time—nowadays one goes more frequently and at an earlier age

to the city or factory. The new conditions of existence bring, in many cases, increased dangers to health and life, dangers which, especially in the case of women, often lead to tuberculosis."

In 1885 the tuberculosis gland cases admitted to the Alexandra Hospital for Sick Children, Brighton, constituted 6·5 per cent. of all admissions. In 1899 they were 3·5 per cent.—a reduction of nearly 50 per cent. Between 1885 and 1899 Brighton has swept away most of its insanitary areas. Numbers of similar instances could be quoted. It is no unwarrantable assumption that by permitting—and that is all we have to do—the sun and fresh air into our slum areas we should see a very marked general decline in the incidence of tuberculosis.

Rickets.

Consider next rickets. Its ætiology is unknown. There are two opposing theories as to its origin—the dietetic and the hygienic. There are those who positively assert that it is a deficiency disease; that it is due mainly to lack of fat-soluble A. There are others who as stoutly deny that diet has anything to do with it. We may leave the theorists to settle their differences and turn our attention to certain facts about it which have long been established, and certain other facts which have recently come to light. It never occurs among races living under natural conditions, and is especially prevalent among the poor in Europe and America living under so-called civilised industrial conditions—in other words, the thoroughly bad hygienic conditions of overcrowding and absence of fresh air and sunlight. Among the well-to-do it is practically unknown. In India, on the other hand, as recently shown by Hutchinson, it is a disease of the rich. It does not occur among the poor labouring class who live an open-air life, but is prevalent among the rich Mohammedans and Hindus, who are confined in airless and sunless rooms. Hutchinson discovered also this remarkable fact—that late rickets was restricted to females, who alone are confined, according to the purdah system of isolation as practised by the wealthy natives of India. Again, eminent observers in Glasgow, who have quite an exceptional acquaintance with rickets—it being, as you know, very prevalent in that city—have always associated the disease with overcrowding and lack of hygienic conditions and sunshine, which you also know are conspicuous features of that great hive of industry. According to Miss Fergusson, 50 per cent. of the children in the poor quarters of Glasgow are rickety—a vastly smaller proportion in garden cities, such as Bournville. The prevalence of rickets, she says, is associated with close confinement in tenements. Most important of all, we have the recent experiments of the Lister Institute in Vienna. They prove conclusively that a deficient diet can only produce rickets in the absence of sunlight. If abundant sunlight be present a deficient diet is powerless to give rise to it. Lastly, we have the significant fact that the sun's rays without any other treatment whatever can cure it—an explanation of the oft-repeated dictum that anybody can cure rickets in the summer.

All this does not prove that the absence of fresh air and sunlight is the cause of rickets; but it does prove this—that in overcrowding, confinement, want of fresh air and sunlight, we have an environment conducive to the development of rickets, either by the supply of conditions favourable to the activities of the virus, whether microbic or otherwise, or by lowering natural resistance to it. Conversely, that fresh air and sunlight and good hygienic conditions furnish an environment which is powerfully antagonistic to the disease; that they have either the power of damping down the activities of the virus whatever it is, or that they can so alter the metabolism of the body as to provide an increased resistance and immunity to it. Whichever is the method, the result is the same. These facts appear to indicate clearly and unmistakably the way to the control of this crippling and dangerous disease. And, as Mellanby says, its eradication would do away with a great deal of the bone deformity, improve the physique, lower the infantile mortality, and, most important of all, improve the teeth of the people of this country beyond recognition.

Venereal Diseases.

Let me invite your attention in the next place to venereal diseases, which have figured so largely in the public eye during recent years, are discussed in every drawing-room, exhibited at every picture-house, and with regard to the most suitable methods of controlling which there are acute differences of opinion, both among medical men and the lay public. They are the diseases of immorality. The contributing environmental factor here is the indiscriminate admixture of the sexes of all ages, a necessity of their living conditions. It is not, of course, contended that by an improvement in housing immorality would be stamped out, but it is contended that the conditions of overcrowding, without regard to age or sex, which exist in our industrial centres make the practice of morality wellnigh impossible.

Let me put before you a few facts; they are taken from the report of Dr. A. K. Chalmers, the medical officer of health for Glasgow, for 1921. There is no intention to single out that city as a sink of iniquity, or an example of a condition of things peculiarly revolting to the conscience of civilised humanity, and I have very little doubt its case could be paralleled in our own borough of Portsmouth; but I have the facts for Glasgow, and I have not similar facts for Portsmouth. In Glasgow, out of a population exceeding a million, over 600,000 live in one-roomed or two-roomed tenements. Under the heading "Sex overcrowding in small houses," Dr. Chalmers gives the following appalling examples:—

"In a one-roomed house a father of 52 occupied the same bed with a mentally defective daughter of 24, who had an illegitimate child of 10. In another, with space for five adults, a father and daughter shared the same bed. In another a mother shared the same bed with two sons of 19 and 20 years respectively. In two-roomed houses, in one instance a son of 19 and a daughter of 21 occupied the same bed; and in another a son of 19 and a daughter of 25, who was pregnant."

However revolting these facts may be, it is right that the public should be made aware of them. This, then, being an example of the state of affairs in our industrial centres, it may be confidently stated that a great deal, at all events, of immorality and its consequences, venereal disease, is the direct result of environment—that the conditions existing make either the teaching or practice of morality impossible, and furnish the breeding ground for venereal disease.

Have we not, it may be asked, missed one phase of the problem, and are we not somewhat out of touch with the situation, with our societies for the prevention of venereal disease and for combating venereal disease quarrelling amongst themselves as to the best means of meeting the evil, and local authorities and the lay public equally divided, when conditions such as I have depicted are rampant in our midst? It is this aspect of the problem—the immorality and its consequence, venereal disease, which are the direct result of overcrowding without regard to age or sex—which I wish to lay particular stress upon here.

The Abuse of Alcohol.

Consider, lastly, the abuse of alcohol. There is no doubt that, without anything in the nature of prohibition in this country (and I believe it to be foreign to the instincts of our people to have their lives, what they may eat, and what they may drink, regulated by the policeman), there has taken place during the past 50 years a steady move in the direction of greater sobriety among all classes of the community. Among the upper and middle classes drunkenness was the fashion less than a century ago. It is now a disgrace. In the army, navy, and mercantile marine there was, 50 years ago, infinitely more drinking than there is to-day. In the streets of our towns the drunken man of any class is not nearly such a familiar sight as he was a generation ago. This must be attributed broadly

to social evolution, to general civilising influences—better education and the inculcation of greater self-respect, which such influences promote. There are, of course, many factors at work here; but in the forefront of civilising influences is the improvement of the home. So long as the public-house is more comfortable and more attractive than a man's home, the former will claim his leisure hours. Give him a comfortable and respectable home, and the lure of the public-house will automatically diminish. In the debate on Lady Astor's Bill, a few months ago, a good deal was said about the improvement of the public-house: but nobody suggested that, by devoting greater attention to the home, we might go a long way to improving the public-house out of existence altogether. Drunkenness stands in much the same relation to bad housing conditions as immorality and venereal disease, and, moreover, is admittedly a potent factor in the dissemination of the latter.

The Economics of the Abolition of Slum Areas.

In the foregoing remarks I have endeavoured to emphasise the relation of the special environmental factors of the slum areas—lack of fresh air and sunlight, and overcrowding—to four out of five of the great endemic scourges afflicting the community at the present time. I have said nothing of their relation to epidemic diseases, though there is no doubt that some of the latter are powerfully influenced by the same factors. For instance, pneumococcus lung infection is certainly a disease mainly of cities and crowded places, the infection spreading from pre-existing cases or healthy carriers. Observations in South Africa showed that natives who had recently arrived at the mines and occupied crowded compounds were most susceptible; and Gorgas, in a report upon pneumonia in the Rand mines, draws attention to the fact that there was the same high incidence among labourers in the Panama Canal zone, until they were removed from crowded compounds and encouraged to live in separate huts. The high mortality attending measles is probably attributable to similar conditions. Epidemic disease is, however, more elusive and less under control, and for that reason I have omitted it from argument.

If, then, I have submitted evidence that, by a determined attack upon our slum areas, there would be a reasonable expectation of making a beginning of the end of four out of five of our most formidable endemic diseases, the question is, Would it be worth while? Not as a sociological venture, or on humanitarian grounds, or as a moral obligation, on any of which there would be little difference of opinion; but "would it be worth while" as a business proposition? Because, however satisfying it may be to our consciences to prate of social and moral duties to our fellow men, when it comes to doing anything, and especially to spending taxpayers' and ratepayers' money, it is usually the business and economic aspect of any question which mostly counts. It is, therefore, from this point of view only that I approach it, and I omit all moral considerations. Besides, moral values cannot be assessed in pounds, shillings, and pence, though nobody would deny that they represent a very real asset.

In a paper read at the meeting in Glasgow last year entitled "The Economics of Public Health" Lieut.-Colonel Fremantle, consulting medical officer of health for the County of Herts, by a series of calculations, estimates the total direct material loss in England and Wales from sickness and disability at a minimum of £150,000,000 a year. From tubercle alone the estimated loss is £94,000,000 a year. In the United States of America, with a population three times as great as England and Wales, the estimated cost of sickness and death is £600,000,000 a year, of which at least one-third is considered preventable. Taking the cost to this country of sickness and disablement at £150,000,000 per annum, the country could spend without loss £50,000,000 annually, or, capitalised at 5 per cent., £1,000,000,000 on clearing the slum areas and securing better housing and living accommodation, provided that the cost of sickness and disablement were thereby reduced by one-third.

What actual sum would go to the credit side of the nation's health bill it is obviously impossible to determine. It would admittedly, therefore, be a speculation. But it would not be a bogus venture. An assured dividend of considerable amount is in sight. The improved physique of the nation; its better health; the diminution certainly, the extinction possibly, of such diseases as tuberculosis and rickets; the improved moral tone of the people, and the resultant diminution of venereal disease and its consequences; decrease in the consumption of alcohol with its disastrous effects on infantile and adult mortality, with the misery and moral degradation it brings to the home, with the loss of time, increase of industrial accidents and industrial inefficiency it entails—these and other items are the prospective dividend. Whether it would or not strike £50,000,000 off the annual health bill is the speculation. In this connexion I would remind the over-cautious and those averse to any kind of speculation or any degree of risk, that it is the speculators who have made this great empire—the men of courage and enterprise, men who have faced the uncertain and the unknown, and have not been afraid to take risks. And if we have not been afraid to speculate in adventure, in arms, in trade, and in business, why should we be afraid to speculate in health?

To face the risk would require a bold and imaginative statesmanship. It does not belong to the business outlook of the parish pump, only prepared to estimate in pounds, shillings, and pence the return on the capital expenditure. It would almost certainly eventually result in a real economy to the State. What we are doing now is to provide the breeding-ground for the mass production of disease with one hand, and with the other paying out millions of the taxpayers' and ratepayers' money to deal with the end-results of the very diseases we are fostering in our midst. It has been frequently said, the people make the slums. Such a pessimistic assumption would sound the death-knell of all progress. But it is nothing more than the comfortable argument of the man selfishly indifferent to the obligations of citizenship and regardless of his duty to the body-politic. It is flatly contradicted by the fact that through all the ages man, like every other living thing, has been the product, not the cause, of his environment. The slums make the people you find in them, and the only astonishing fact is that they can breed any other sort. It is a testimony to their physique and spirit and grit, no less than to the universal natural law of the survival of the fittest, that some of the inhabitants of the slums win through such an environment and escape the moral and physical ruin which engulfs those of weaker fibre.

The industrial revolution which occurred in the last century accounted for the urbanisation of our population, and the herding together of millions of workers in our industrial centres. This has been going on ever since. The early hour at which work commenced, the long working day, entire absence of rapid transport, or rather of any transport at all, necessitated their centralisation in the heart of our great towns, where land has consequently become of greater value than health. These conditions are reversed to-day. Powerful centrifugal forces have come into play, and have come to stay. The working day as a rule begins later, the hours are shorter, the day for half the year is longer owing to the Daylight Saving Act, and the means of rapid transport are available, and are becoming increasingly available every year. It has become, therefore, practicable in many instances for the worker to live further from his work—in other words, to move from the centre towards the periphery of our large towns, where land is cheaper and where it becomes, therefore, a business proposition to build on town-planning lines, and avoid the past errors of herding human beings together like sheep in a pen or pigs in a sty.

Air Space and Sun Space.

In this connexion it would seem that the first and most essential requirement in future building is to reduce the density of the houses—in other words, the number to the acre; and it is disappointing, and in the opinion of many a grave defect in the Government's last Housing Bill, that no such restriction appears. In submitting town-planning schemes, however, local authorities have, under the Housing Acts, powers to regulate for this, and a memorandum from the Ministry of Health suggests 12, 10, or 8 houses to the gross acre as suitable density requirements according to the nature of the neighbourhood. If this in the opinion of the Ministry is the correct requirement for health, what are we to say about houses built 40 or more to the acre? The only answer is that they should be swept away wholesale at the earliest possible opportunity.

The air space and sun space round the house is of infinitely more importance than the size of the house itself, or whether it contains a parlour or not. The cramped crofter's cottage does not produce rickets and tuberculosis, because his children live mostly in the sun and air round their dwelling; but children "cabined, cribbed, confined" in the dark sunless and airless environment of our large towns are inviting both all the time. The most important educational requirement of domestic hygiene and its highest fulfilment is the open window, night and day, summer and winter. It is astonishing how quickly the human organism abjures the hothouse conditions of civilised living and adapts itself to its natural environment, fresh air. The tuberculous patient, after three months' open-air treatment in a sanatorium, cannot endure the closed window in his own home. The tuberculous children at Leysin in Switzerland, and at Alton and Hayling Island in this country, live practically naked in the open air, and by that habit and that habit alone throw off a most formidable and deadly disease. Why, then, all the care of healthy children, with their active metabolism capable of adapting itself to almost any requirement, to wrap them up in the warmest of clothing, confine them in hot rooms with windows shut, keep every draught from their bodies, and submit them to general hothouse conditions suitable only to the old whose metabolism is barely sufficient to keep body and soul together, and whose clock has almost run down?

Modern civilisation is suffocating itself in the polluted atmosphere and darkness of our great industrial cities. The need of pure air and sunlight, of which there is plenty about, and to be had for nothing, was never so insistent as it is to-day. These great gifts of nature were plentifully supplied to primitive man, and were his only sure defence against disease. They are as bountifully given to civilised man, but he seems to have lost sight of their value, or to have deliberately turned his back on them, while he requires a whole volume for the mere nomenclature of his innumerable diseases.

Sociology and Medicine.

Perhaps apology is needed for touching to-night on a problem which may be considered rather a sociological one than one of strictly scientific medicine. But apart from the fact that I believe a wide latitude is permitted in the Presidential Address to this Association, my choice of subject can, I think, be justified by both local and general as well as scientific considerations. First of all, it does not seem to be an unfitting subject to bring to your notice in the town which bred Charles Dickens and Walter Besant, who devoted their unrivalled literary talents to depicting scenes and characters drawn from our slums, and such as our slums are only too familiar with. Secondly, although this borough has witnessed some of the most brilliant pageants and displays in the history of this country, and although you are sitting here in what we are proud to think is one of the finest town-halls in the kingdom, yet there is an obverse to the shield, and round the corner we can introduce you to slums as pestilential and overcrowded as any to be found in the land. Further, although the environment of the wage-earning classes, in our industrial centres, and its effects may in part be a sociological question, I have endeavoured to show that it is inseparably linked up with, and *is* in fact the greatest of all our problems of preventive medicine, the most rational and the most scientific of all medicine. And if this is so, then it is up to the medical profession, both individually and through this great Association of medical men, to educate and lead public opinion in this matter, and to strengthen the hands of governments and local authorities, on whom will ultimately devolve the responsibility, no less than the odium, of providing the remedy. Concentration on the prevention of disease, on strengthening resistance to disease, by the improvement of environment, rather than on the search for cures or palliatives when the damage is already done; more attention to stimulating and fortifying the natural defensive mechanisms against disease, less to direct attack on disease itself; as Professor Wynne so ably put it last year, concentration on the environment rather than on the individual—this appears to me to be the most scientific, the most economical, and the most productive means of combating the worst of the evils from which the community suffers. If, in conclusion, I might sound a personal note, it is this—that as Chairman of the Health and Housing Committee of this great borough, by the goodwill of my colleagues on the Council, this is a conclusion forced upon me by no mere theoretical considerations, but by an everyday acquaintance with undeniable facts.

PRIMARY AND SECONDARY RESISTANCE TO THE INDUCTION OF CANCER.[1]

BY J. A. MURRAY, M.D., B.SC. EDIN.,
DIRECTOR, IMPERIAL CANCER RESEARCH FUND, LONDON.

I.—PRIMARY RESISTANCE.

THE researches on experimental carcinogenesis of the past ten years have familiarised pathologists with the constancy with which a continuation of the effective stimulation over a considerable time is essential to successful induction of cancer. This feature of the course of such experiments harmonises with the chronic character of the irritations which clinical experience of the disease in man and animals has shown to be nearly universal in those forms of the disease where such a nexus can be inferred. Taken in conjunction with the histological identity of the lesions, it gives us reasonable assurance of the fundamental identity of the processes involved in cancer as it occurs naturally and under experiment. Of all the methods which have been used to produce cancer in experimental animals (X rays, animal parasites, tar, paraffin, arsenic) the application of tar, or tar products, has been most widely employed, and our knowledge of its action is correspondingly extensive. In what follows this is the only method to which reference will be made, but it must be clearly understood that once malignant growth has been started by this means, there are no characters, clinical or microscopic, by which the tumours can be distinguished from those of the same tissue produced by other agencies or arising spontaneously—i.e., without known association with external agencies.

The length of time which elapses from the beginning of tarring till real autonomous growth sets in shows great variation even in animals of the same species. In the mouse this interval may be as short as three months, or as much as 18 months, and in one experiment a mouse remained free from growth, although tar had been applied to the same area twice weekly for more than 18 months. The majority of mice,

[1] Read at the Cancer Congress at Strasbourg on July 23rd, 1923.

however, develop skin carcinomata within six to nine months of tarring applied twice weekly. The extent of the area painted appears to have little influence. Very similar results have been obtained by painting the whole dorsal surface of the animal (Deelman), or an area of a square centimetre (Fibiger and Bang) or less (Murray and Woglom). The frequency of the applications, as might be expected, affects both the rapidity of induction and the percentage of success. Even a reduction from twice to once weekly prolongs considerably the interval necessary to produce cancer in mice, and the majority of workers have made their applications on alternate days or three times a week.

An interesting question is whether there is an upper limit to the intensity of the stimulation which may be followed by cancer production. In an experiment on rabbits in this laboratory it was found that bi-weekly applications of ethereal extract of tar to a small area on the nape of the neck produced highly inflamed and painful excoriations within a month. The applications were discontinued for two to three weeks, and then begun again, but only once weekly. The irritative phenomena did not recur, but after six to eight months from the beginning of the experiment—two rabbits out of 15 showed localised progressive lesions which continued after painting was stopped, and proved to be typical squamous-cell carcinomata when examined microscopically after excision. When it is remembered that Yamagiwa and Ichikawa had to persevere for two years to produce carcinoma of the rabbit's ear and that neither Fibiger nor Leitch (personal communications) have obtained progressive autonomous growths after the same length of time in the same species, the suspicion seems justified that the success in this experiment was in part due to the less severe and more widely spaced stimulation. As pointing in the same direction, it may be mentioned that cancer has never been observed in the workers in chromic acid factories, in whom chronic ulcerations, known as chrome sores, are common. Then again, X ray cancer has rarely supervened at the site of X ray burns and never after radium burns, but rather in areas subjected repeatedly to slight amounts of irradiation. Contrast also the occurrence of carcinoma of the skin in locomotive engine-drivers exposed to the irradiation from the open fire-box with the fact that the much more intense stimulation of the finger-tips by pipe-smokers in pressing down the glowing tobacco is apparently never followed by cancer.

According to Deelman, the association of another kind of injury with tarring results in a shortening of the time necessary to produce cancer. Deelman scarified the dorsal surface of mice immediately before tarring. The treatment was carried out on alternate days for a week and then tarred without scarification thrice weekly for one month. Papillomatous new growths, going on to malignant new growth, supervened after five to eight weeks after the beginning of the experiment—i.e., roughly one-quarter of the time necessary without scarification. Deelman considers that scarification merely permits a more intimate application of the tar to the deeper layers of the skin, but the following observations suggest that a more fundamental significance should be attributed to it. When the area scarified and tarred is small the time of cancer production is not shortened in anything like the proportion obtained by Deelman. It is also significant that he found that repetition of scarification after the first week did not further accelerate the onset of neoplastic change. It is as if the trauma, and the reparative changes following it, had put the cells in a more receptive condition for the carcinogenetic action of the tar.

The relation of trauma to the induction of new growth is further illuminated by the work of Drew on the mechanism of repair by the method of tissue culture. It has been known for a long time that actively growing embryonic tissues, and tumours also, proliferate immediately when placed in a suitable medium outside the body. The quiescent tissues of the young or adult animal, on the other hand, do not begin to grow till after the lapse of an interval more or less prolonged. Thus, Drew found that heart or kidney of the rat may lie dormant for from 10 to 14 days in a medium in which the corresponding embryonic tissues, and tumours, would have shown vigorous growth in 24 to 48 hours. When a filtered saline extract of disintegrated rat kidney which has been incubated at 37° C. for two to four hours is added to the culture-medium, adult tissues begin growing at once and in 48 hours spread out on the cover-glass in a sheet of healthy dividing cells. The initial delay has been eliminated. If the disintegrated kidney instead of being incubated is maintained at 0° C. for two hours and then filtered off, the fluid is devoid of this actively stimulating property. When a corresponding cold extract is prepared from a rapidly growing transplantable carcinoma or sarcoma of the mouse it is found to be as rich as, or richer than the extract of incubated damaged normal tissue, in the activating substances. From these observations, many times repeated and always with the same result, it is concluded that these malignant growths produce continuously of their own accord growth-stimulating substances which normal tissues only elaborate in response to cell damage. A direct relation exists between the growth-stimulating power of the tumour extracts and the rate of growth of the tumour used to prepare it. This suggests strongly that the biochemical mechanism by which their proliferation is maintained is, at any rate in part, by the elaboration of this growth-activating substance or substances. It is not desirable to attempt, at the present stage of these investigations, a speculative development of this conception of the nature of neoplastic proliferation further than to point out how well it accords with the additive effect of trauma in accelerating carcinogenesis as shown by Deelman. A certain amount of activating substance is probably produced by any kind of cell damage, and when by constant repetition this production has become automatic, proliferation will continue after removal of the cause of protoplasmic disintegration. Temporary hypertrophies would, in this conception, correspond to the purely reactive production of activator, ceasing when the irritant is removed, benign growth to an autonomous production in small amount, and malignant growth to a more abundant production.

In the past one has been accustomed to regard the preparatory period of chronic irritation which precedes the development of cancer as occupied in a gradual cumulative removal of resistance on the part of the organism to the unrestricted powers of growth of its constituent cells. This resistance, variously designated by inhibition, internal tissue tension, and similar fantastic expressions, was regarded as holding the tissues in check. The preceding discussion leads to a somewhat different conception—viz., that in cancer the cell acquires new properties, exploitations, if you will, of the normal cell activities, but acting in a new way with disastrous consequences to the organism.

Two other features of the development of cancer under experimental conditions bear on this conception of the secondary character of the neoplastic transformation. The first is the discrete focal character of the process. Growth begins in isolated, usually minute, areas and not diffusely throughout the whole zone of application of tar. The second is the existence of a latent period, very little affected by continuation of the irritant as indicated by Deelman's work and emerging clearly from the deliberate experiments of Leitch and of Bang. These authors working independently stopped the application after two, three, or more months in animals which had shown no proliferative changes or only slight hyperplasias, and found cancer appearing after a further interval at the treated site. In several instances the local hyperplasia had regressed and the skin had become smooth and the new growth started in the otherwise normal hairless area.

1

FIG. 1.—Slight proliferative changes at margin of tarred area of skin in a mouse which had spontaneous mammary carcinoma excised. Duration of tarring, 23 weeks.

2

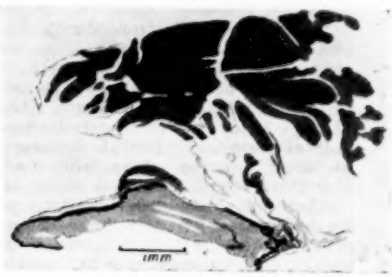

FIG. 2.—Absence of new growth in area tarred with ethereal extract in the mouse in which the alcoholic extract had produced the carcinoma shown in FIG. 3.

3

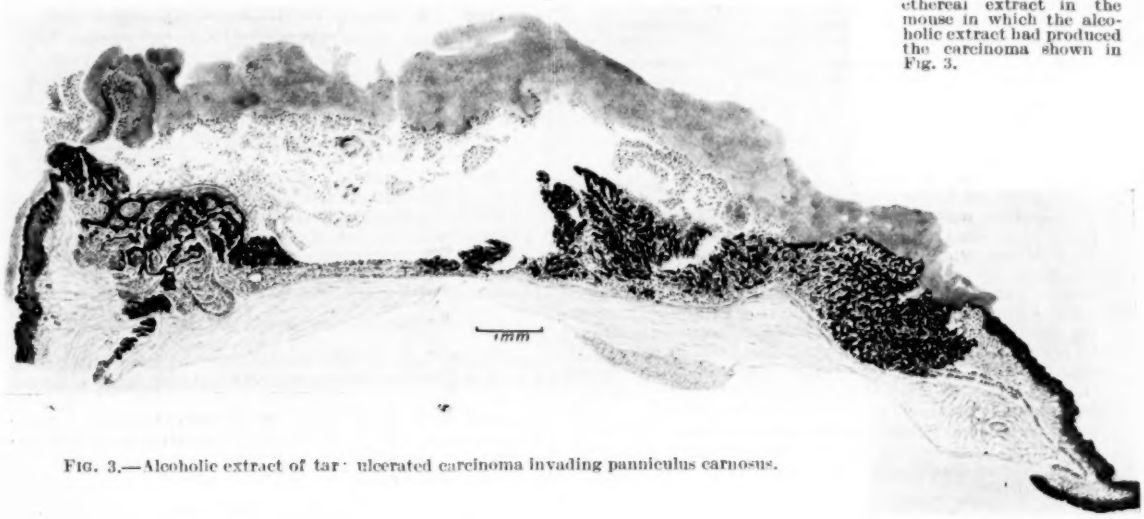

FIG. 3.—Alcoholic extract of tar: ulcerated carcinoma invading panniculus carnosus.

4

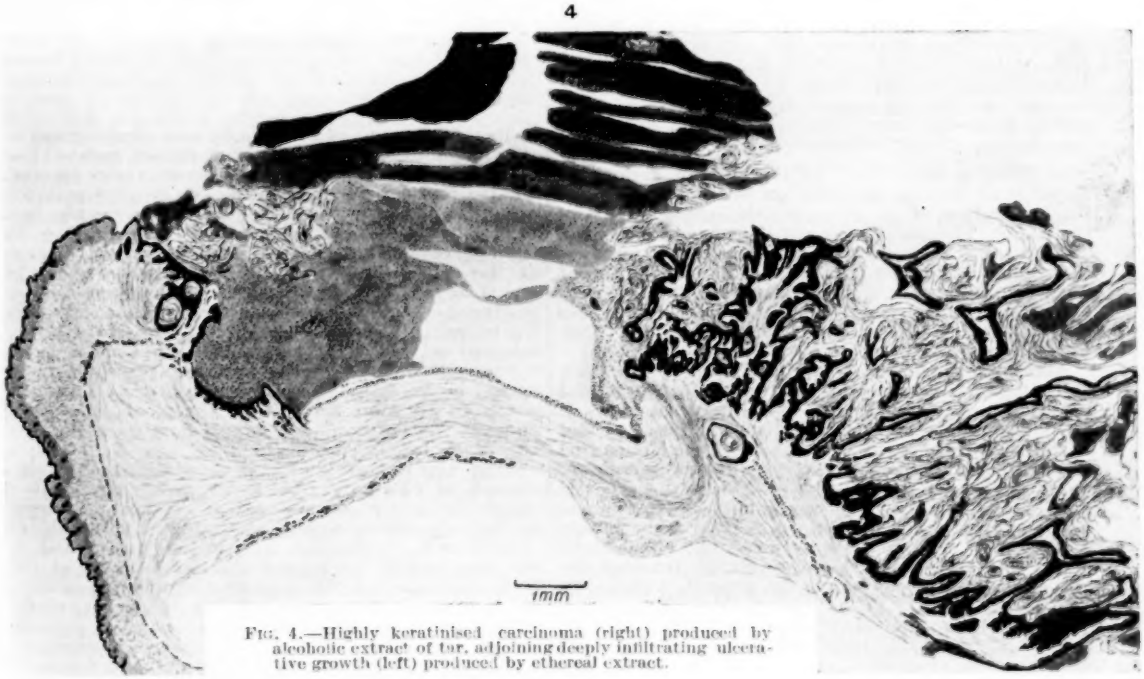

FIG. 4.—Highly keratinised carcinoma (right) produced by alcoholic extract of tar, adjoining deeply infiltrating ulcerative growth (left) produced by ethereal extract.

II.—SECONDARY RESISTANCE TO CANCER PRODUCTION.

The strict localisation of experimental tar cancer to the area painted would lead one to expect that subsequent tarring of another area remote from the first would again result in the production of a fresh primary growth at the new site. As a rule, experiments of this kind end prematurely by the death of the animal from intercurrent disease or from metastasis in internal organs from the first primary growth. For this reason, although these attempts have been carried out for more than two years in more than 50 mice in which experimental tar cancer had been produced, the number in which the second tarring was at all commensurate in duration with the first is still very small. Table I. gives the duration of the first tarring, the interval between the two series of applications, and the duration of the second tarring.

TABLE I.

Identification number.	Duration of first tarring.	Interval.	Duration of second tarring.
1577	25 weeks	36 weeks	24 weeks
1632	58 ,,	8 ,,	25 ,,
1717	28 ,,	12 ,,	29 ,,

In none of these mice was there any indication of proliferative changes at the secondary site. The hair fell out in the treated area and the skin was found to be atrophic when it was examined in sections. Taken by themselves these observations are without significance, except incidentally for the doubt they throw on the presumed predisposing action of age as increasing the liability to cancer, if no other factor be assumed to operate. The result of a similar trial in mice with spontaneous mammary cancer, however, increases the probability that these negative results are not fortuitous, but due to a real unsusceptibility of the animals to the carcinogenetic action of tar. Table II. gives the duration of the tarring of mice in which spontaneous mammary carcinoma had been removed by operation.

TABLE II.

A = Identification number. B = Duration of tarring in weeks.

A	B	A	B	A	B
1595	20	1649	20	1758	14 S
1601	23	1655	21	1760	25 S
1620	22	1737	37 S	1777	11 S
1635	17	1755	18 S	1787	8 S
1641	24	1757	9		

Result.—No. 1755: Metastases in lungs. No. 1787: Papilloma growing progressively after cessation.
S = Scarification (see context).

In those marked "S" in the column giving the duration of tarring, scarification was combined with the application of tar either for the whole or part of the time. The result after eight weeks in mouse No. 1787 is taken to indicate that the failure to produce any proliferative changes was not due to insufficient duration or intensity of the applications, but indicates a real inability of these animals to respond to this stimulation, carcinogenic for normal animals. (See Fig. 1.)

Another experiment was carried out to see how long the first stimulation must precede the second in order to prevent the development of cancer from the latter. This experiment is still in progress and only the first provisional results in six mice out of 50 tested are available. These 50 mice were painted twice weekly on the left shoulder with the ethereal extract of tar with which most of these experiments have been performed. Seven weeks after the beginning of the tarring, applications were begun on the right flank, unaltered hairy skin intervening between the two areas. The result up to the present is shown in Diagram A.

In two mice carcinomata have developed at both sites and practically simultaneously. In the other four no growth has been produced at the second site, although in all but one which died early, tarring has been kept up for a period, as long as, or longer than, was necessary in the first instance.

Some of the peculiarities in the results of another experiment, planned originally to show the relative carcinogenic efficacy of the alcohol soluble, and of the ether soluble fractions of tar in comparison with the unaltered whole tar, bear out this conclusion of a general systemic effect of the development of one primary growth, on the liability of the animal to develop another primary growth. The experiment

DIAGRAM A.

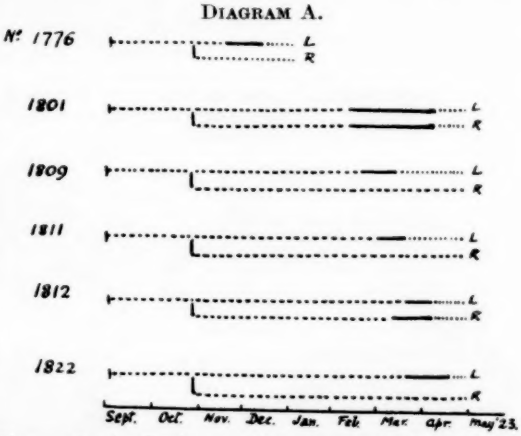

Diagram showing development of carcinomata in six mice painted twice weekly on left shoulder with ethereal extract of tar, and seven weeks later also painted on right flank.

was begun before this possibility had been suspected. Unaltered whole tar, alcoholic extract, and ethereal extract of tar were applied simultaneously to separate areas of the dorsal skin of 60 normal mice. After four months, when the first tumour appeared, 50 mice survived, and in these 25 presented malignant new growths distributed as follows:—

TABLE III.

No. of mice.	Tar.	Alcoholic extract.	Ethereal extract.	
11	−	−	+	22
10	+	−	+	
1	−	+	+	
2	+	−	−	
1	−	+	−	
25				

Twenty-two out of 25 animals bore carcinomata at the site painted with the ethereal extract and in 11 of these no tumours developed at the other sites painted. Twelve had carcinomata at the site treated with the original tar, and of these ten had growths at the area treated with ethereal extract, two only having no tumours elsewhere. Only two mice developed tumours at the site painted with the alcoholic extract. In one of these (No. 1710, Fig. 4) the ethereal extract also produced a tumour. In the other, only a slight warty thickening appeared at the site treated with the ethereal extract. (Figs. 2 and 3.) While the ethereal extract is definitely more certain, it is not more speedy in its action than unaltered tar. Both preparations are more active than the alcoholic extract and yet the latter in one mouse alone gave rise to a carcinoma. (Figs. 2 and 3.)

This experiment shows that when several substances of different carcinogenic power are applied simultaneously to separate areas of skin, the result cannot be predicted with certainty from a knowledge of their respective strengths. The relatively weaker whole tar may inhibit for a time the development of the tumour produced by the more active ethereal extract. In one mouse the very much less efficient alcoholic extract had produced a tumour which grew progressively, while the ethereal extract lesion remained stationary. Taken in conjunction with the results of the retarring of tumour mice already described, this

experiment, admittedly difficult to interpret, gives indications of a mutual influence of approximately contemporaneous tumours, by which their full cancerous development is retarded for a time or permanently. The other experiments show that the induction of a fresh primary growth after a first has been definitely established meets with a very intense resistance, whether the first tumour be of the same parent tissue or another. The nature of this secondary refractoriness to the induction of cancer is obscure. It is not a resistance to growth, as is shown by the occurrence of metastases and the success of autoplasty. It is apparently an inability to react with cancerous proliferation to procedures which initiate it with certainty in normal animals. Nor has it anything in common with the well-known acquired resistance to the growth of transplantable tumours. Fibiger has produced experimental tar cancer in such resistant animals, and the development spontaneously of mammary carcinoma has also been recorded in these so-called "immunes."

The nature of this refractory state must be the subject of further investigation. The rarity of multiple primary malignant new growths in the same individual finds a rational explanation by it. Its greatest interest and importance, however, lies in the indication it gives of a systemic, constitutional change in the organism in which cancer has developed, a change which, if it could be recognised with certainty and rapidity, would enable us to recognise cancer in its earliest stages, and could we produce it without initiating new growth, would place in our hands a rational means of prevention.

THE IMMEDIATE PROGNOSIS IN NEPHRITIS,

WITH SOME REMARKS ON URÆMIA.

BY O. L. V. DE WESSELOW, M.B. OXF., F.R.C.P. LOND.,

CHEMICAL PATHOLOGIST, ST. THOMAS'S HOSPITAL, LONDON.

WITH the increasing application of chemical methods to the study of the disease, the accuracy of our prognosis in nephritis has made a considerable advance. The bulk of modern work has centred round the question of the retention of the nitrogenous waste products in the blood, and has more especially concentrated on the content of the blood in urea, on account of the ease and accuracy with which this substance can be estimated. There can be no doubt, however, that an estimation of the urea content of the blood in cases of severe azotæmic nephritis does not necessarily settle the question of the immediate prognosis. A blood-urea content as high as 300, or even, in rare instances, 400 mg. per 100 c.cm., is not incompatible with recovery in an acute case, and even in chronic types of nephritis, in which the capacity for recovery is of necessity less, a blood-urea content of 100 to 200 mg. does not necessarily imply a speedy death. A confident prognosis can therefore scarcely be ventured upon from an estimation of the blood-urea alone, and several estimations at intervals of some days may be necessary before an opinion on the immediate outlook can be given.

That this difficulty does actually exist in practice is shown by the stress laid by certain American authors on the creatinine content of the blood. Creatinine is assumed by these workers to be more readily excreted by the kidney than either uric acid or urea, and is, therefore, the last of the nitrogenous waste products to accumulate in the blood. On this assumption, any marked creatinine accumulation is to be regarded as indicative of very severe renal functional impairment, and of the terminal stage of the disease. The whole question of the accuracy of the creatinine estimation has, however, been reopened by Benedict,[1] who has even gone to the length of suggesting that practically no creatinine is present in the blood, though he believes that the estimation of the substance, whose chromogenic reactions have led to its confusion with creatinine, is still of value. Folin,[2] also, has come to the conclusion that the retention of the various nitrogenous waste products in the azotæmic type of nephritis proceeds pari passu, and that the suggested delayed retention of creatinine does not actually occur.

A plea may therefore be entered for the value of a determination of the plasma content in inorganic phosphorus (phosphate) in estimating the probable outcome of a case of azotæmic nephritis. The phosphate estimation by the method of Bell and Doisy,[3] as modified by Lehmann, is simple, rapid, and apparently accurate; and, while there is no evidence that the nitrogenous waste products exert any toxic influence upon the organism, phosphate retention is associated with certain definite chemical changes in the blood, which are apparently of importance in the symptomatology of uræmia. The retention of the nitrogenous waste products is a useful guide to the degree of renal damage present, but in itself is apparently harmless; phosphatic retention, on the other hand, appears to involve certain deleterious results.

Though retention of phosphates is undoubtedly associated with impairment of nitrogenous excretion, and though, when a series of cases is averaged, it is found that the rise in the plasma phosphate closely corresponds to the degree of urea retention, in individual cases marked differences in the degree of retention of the two bodies occur. Thus we may find a high blood-urea with a relatively low plasma phosphate content, and conversely. The cause of these differences in the degree of retention of the two bodies is uncertain; the available evidence would appear to suggest that they are the results not so much of variations in excretion as of variations in the diet, and in the demand for phosphorus and nitrogen for anabolic purposes.

Value of Estimation of Inorganic Phosphorus.

The value of the estimation of the inorganic phosphorus in prognosis is illustrated in Table I., in which the figures for blood-urea and plasma phosphorus in 53 consecutive cases of nephritis are tabulated. Where a series of estimations have been made in a patient, the highest figures obtained for the urea and phosphorus are given. In all the fatal cases death resulted from true uræmia. Two cases of nephritis, in which the disease was complicated by peritonitis and by portal pyæmia, and which terminated fatally, have been omitted; in both of these the plasma phosphate content showed no appreciable rise. The normal inorganic phosphorus amounts to between 2 and 4 mg. per 100 c.cm. of plasma.

TABLE I.—*Blood-urea and Plasma Phosphorus in 53 Consecutive Cases of Nephritis.*

Blood-urea mg. per 100 c.cm.	Cases.	Deaths.	Plasma phosphates as mg. P per 100 c.cm.	Cases.	Deaths.
400–566	6	6	10–22	12	12
300–400	3	2	8–9	2	1
200–300	4	3	7–8	2	—
100–200	7	2	6–7	2	—
50–100	7	—	5–6	7	—
Below 50	26	—	Below 5	28	—

The number of fatal cases is small, but the conclusion as to the prognostic value of the phosphate estimation appears to be justified. A sharper line separates the fatal from the non-fatal cases from the standpoint of the plasma phosphorus than from the standpoint of the blood-urea. It is not, of course, suggested that a plasma inorganic phosphorus content exceeding 10 mg. per 100 c.cm. *invariably* implies a speedy death, but merely that as regards the immediate prognosis the degree of phosphate retention is a better guide than the degree of urea retention.

As an illustration of this, Table II. gives the parallel figures for a small number of fatal and non-fatal cases.

TABLE II.—*Blood-urea and Plasma Phosphorus in 5 Fatal and 5 Non-fatal Cases.*

Fatal.			Non-fatal.	
Urea.	Plasma P.	Length of survival in days.	Urea.	Plasma P.
269	17·5	3	150	5·0
171	15·1	7	196	7·0
198	14·2	3	223	5·6
238	11·6	4	167	6·7
429	12·0	2	267	8·8

Apart from the question of the immediate prognosis, phosphate retention is apparently more definitely connected with the symptoms of true uræmia than is the retention of urea. Cases are occasionally encountered in whom both phosphate and urea retention are present, and in whom the plasma phosphate shows a temporary fall without a corresponding drop in the blood-urea. Under such conditions the symptoms of uræmia may largely disappear during the period of the phosphate fall, in spite of the persistence of a high blood-urea content. Though the weight of experimental evidence would appear to be against the existence of a definitely toxic action of the phosphate ion, its increase in the blood is associated with certain changes in the chemical composition of that fluid which are probably of importance to the organism. The first of these is a reduction in the bicarbonate content of the plasma, often extreme and proportionate to the increase in the plasma phosphate[4]; the second, possibly of more significance, is a reduction of the serum calcium. In the present series the lowest calcium content observed was 5·1 mg. per 100 c.cm. of serum, or about half the normal. The calcium decrease was, on the average, proportional to the increase in the phosphate content of the plasma, and is probably the result of that increase, since experimentally injections of orthophosphoric acid or of phosphates are followed by a decrease in the calcium of the serum. Of ten fatal cases, in which the calcium was estimated, the serum contained less than 7 mg. per 100 c.cm. in nine.

Differentiation of Types of Uræmia.

There can be no doubt that the lines of differentiation between the various types of uræmia originally laid down by Volhard[5] still hold good, though recent investigations have added considerably to our knowledge of the chemical changes present. Volhard distinguished true uræmia from the eclamptic pseudo-uræmia which is seen in acute and subacute diffuse nephritis and also in eclampsia. The symptoms which he regarded as typical of true uræmia are, in brief, weakness and wasting, gastro-intestinal disturbances, liability to infection, motor hyperexcitability, and hyperpnœa. The gastro-intestinal symptoms are not infrequently the only sign of the presence of the disease until the terminal stages are reached. Death occurs from cardiac failure after a period of coma of variable duration. True uræmia is frequently a singularly undramatic condition, and is, in many instances, indistinguishable from the so-called latent uræmia which follows bilateral calculus suppression, or cortical necrosis of the kidneys. There is, in fact, no good reason for distinguishing two conditions which clinically and chemically appear to be identical. As Volhard pointed out, an essential feature of the condition is nitrogenous retention, and to this we can now add phosphate retention, diminution in the plasma bicarbonate, and a fall in the calcium content of the serum. The hyperpnœa may reasonably be ascribed to the acidosis which results from phosphate retention; it is continuous and not paroxysmal, resembling the hyperpnœa of diabetic coma. The characteristic localised muscular twitchings or tremor, which are a sign of grave prognostic import, appear to be associated with the diminution in the serum calcium. Theoretically such a diminution should result in increased nervous irritability, and in my own experience those cases in which the calcium fall has been most pronounced have shown this symptom in its most marked form. The blood pressure may be raised, but in a considerable proportion of the patients lies within normal limits; in the present series a case of chronic nephritis, showing a blood-urea content of 561 mg. per 100 c.cm., gave a systolic reading of 124 mm. Hg, while in another patient who gave a history of renal disease of four years' standing, and in whom the blood-urea reached a figure of 269 mg., the systolic blood pressure was 118 mm. Hg. This absence of any correlation between nitrogenous retention and a raised blood pressure is now well recognised, and it has been shown that attempts to raise the blood pressure in the azotæmic type of nephritis by high protein feeding are without result.

The actual cause of death in this type of uræmia remains unknown. The available evidence is against any toxic action of the accumulated nitrogenous waste products, nor has it been satisfactorily proved that the phosphate ion is in itself poisonous to the organism. The effect of the depleted plasma bicarbonate with the resulting tendency to an uncompensated acidosis is uncertain; the administration of sodium bicarbonate and correction of the deficit in the alkaline reserve of the plasma has, however, as in diabetic coma, no definitely beneficial result. It is possible that the ultimate cardiac failure may be associated with the fall in the serum calcium.

In eclamptic pseudo-uræmia, on the other hand, the symptoms are more striking, but the prognosis is relatively good. The most prominent symptoms—headache, vomiting, slow pulse, and generalised convulsions—are apparently of cerebral origin. In some cases temporary amaurosis occurs, and the patient may lapse into coma without preceding convulsions. The symptoms of the condition, whether occurring in connexion with acute nephritis or with true eclampsia, are the same. The chemical examination reveals few abnormalities. The blood is dilute, the percentage of serum solids being considerably less than normal, a condition which is not necessarily present in true uræmia; some degree of chloride and water retention can be shown to be present by balance experiments, and œdema, often slight in degree, is present in all cases. In contra-distinction to true uræmia, the blood-urea content is not appreciably increased, and phosphate retention is absent; the alkaline reserve of the plasma, if estimated before the occurrence of the convulsions, shows no definite diminution. The serum-calcium content, at any rate in cases of true eclampsia, may be at a practically normal level; in six eclamptic patients whom I have had the opportunity of examining the calcium has ranged from 8 to 9·4 mg. per 100 c.cm. of serum. Localised muscular twitchings are absent and the nervous symptoms are cortical rather than peripheral.

The most probable explanation of the chief symptoms of the condition would still appear to be the original suggestion of Volhard, who ascribed the symptoms of pseudo-uræmia to an increased intercranial pressure associated with the raised blood pressure and œdema. On lumbar puncture the intrathecal pressure is abnormally high, the convulsions are frequently preceded by a rise in the blood pressure, and, when once the blood pressure shows a definite fall, no further fits need be anticipated. The chief objection to this theory of pseudo-uræmia lies in the fact that cases of true eclampsia are said to occur without any definite rise in the blood pressure. Further investigation of this point is highly desirable. Briefly, eclamptic pseudo-uræmia is characterised by cerebral symptoms, in association with some degree of retention of water and chlorides and a raised blood pressure; nitrogenous and phosphate retention and the other chemical changes

typical of true uræmia are absent, and in contrast with the latter condition the prognosis in both eclamptic and nephritic types is good, provided that death does not result from the convulsions. The ultimate renal recovery is, as a rule, complete. The whole root of the matter would appear to lie in the cause of the raised blood pressure in the pseudo-uræmic cases, and of this no satisfactory explanation can as yet be given. The rapid changes in the height of the blood pressure appear to preclude anatomical changes in the vessel walls as a factor; the influence of the hydræmic plethora is doubtful, since marked hydræmia does not necessarily involve a rise in the systolic pressure; the most plausible explanation would appear to lie in the presence of some as yet undetermined pressor substance in the circulation, but such an explanation is at present mere hypothesis. It must even be admitted that we have, as yet, no definite evidence that the renal lesion in these cases is primary. The reported occurrence of a rise of blood pressure in the eclamptic type of pregnancy toxæmia before albumin appears in the urine is of interest in this connexion.

Lastly, in subacute nephritis the two types of uræmia may coexist, and this fact has, in the past, led to considerable confusion. In such cases a raised blood pressure, hydræmia, and convulsions are combined with retention of nitrogenous waste products and phosphates, and with depletion of the plasma bicarbonate and serum calcium. In such cases the prognosis is of the worst. The condition can only be distinguished from eclamptic pseudo-uræmia by the chemical examination of the blood, which at once reveals the true condition of affairs.

For the sake of clarity, the findings in the three conditions are summarised in Table III.

TABLE III.—*Findings in Three Types of Uræmia.*

—	Blood	Plasma.		Serum.		B.P.
	Urea mg. per 100 c.cm.	Phosphates as mg. P per 100 c.cm.	CO_2 vols. per 100 c.cm.	Calcium mg. per 100 c.cm.	Solids per cent.	Systolic.
Normal	20–30	2–4	60–70	9·6–10·6	9–10	120–130
True uræmia	550	18	24	5·5	9·5	124
Pseudo-uræmia ..	30	3·7	56	9·4	7·1	190
Mixed uræmia ..	270	15	30	6·0	7·5	180

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SECONDARY ANÆMIA IN INFANCY:

A RECORD OF SOME CLINICAL OBSERVATIONS.

BY HELEN M. M. MACKAY, M.D., M.R.C.P. LOND.,

ASSISTANT PHYSICIAN TO THE QUEEN'S HOSPITAL FOR CHILDREN, AND TO THE INFANTS HOSPITAL, LONDON.

SECONDARY anæmia has long been recognised as of common occurrence in infancy, and undoubtedly results from many and diverse causes. The present article is concerned with the condition seen in a group of infants otherwise in good or fairly good health, who were receiving a diet consisting chiefly of cow's milk, with or without heavy carbohydrate additions.

Milk Diet as a Cause of Anæmia in Infants.

Anæmia in subjects on such diets has been frequently described, but opinion as to its cause and symptomatology shows wide variation. Milk contains an extremely small amount of iron, a quantity insufficient for the needs of the growing infant (Morse and Talbot[1]), and the amount present in cow's milk is probably even less than that in human milk (Finkelstein[2]). The percentage of iron retained is apparently less in a baby fed on cow's milk or goat's milk than in one fed on human milk (Krasnogorski[3] and Blauberg[4]), so that the amount of iron obtained from a milk diet by a bottle-fed baby does not nearly suffice to meet its needs. Bunge[5] has shown that there is in the liver of young animals at birth a store of iron, which makes good this deficiency in milk during the period of lactation, and that this store diminishes progressively in amount during the time of milk feeding. In the infant it has been demonstrated that two-thirds of this store of iron is deposited during the last three months of intra-uterine life, so that a premature infant is born with a small store of iron, though the percentage per kilo body weight is approximately the same as in the full-term child (Hugouenq[6]). Premature infants are specially liable to anæmia, and some authors have held that every premature infant fed exclusively on milk becomes anæmic, as it is born before a sufficient amount of iron has been accumulated in the liver (Schultness[7]). Many workers claim excellent results from the administration of inorganic iron salts by mouth in this condition. Schwarz and Rosenthal,[8] for instance, say that they are able to bring about an increase of 20–30 per cent. hæmoglobin in a few weeks by the administration of iron alone. The majority of writers (e.g., Schultness,[7] Finkelstein[2]), however, advise a restriction of the quantity of milk in the diet and more mixed feeding besides treatment with iron salts. Most of the French authors (e.g., Hallé and Jolly,[9] Leenhardt[10]) consider that the type of anæmia produced in infants by an insufficiency of iron in the diet resembles chlorosis as seen in young adults, and have called it the "chlorotic type" of anæmia in young children.

Certain German authors have differed entirely from these views. Kleinschmidt,[11] after an exhaustive summary of the literature and an examination of his own cases, arrived at the conclusion that the condition resulting from a one-sided milk dietary, which he terms "alimentary anæmia," presents a very varied picture. There are all gradations in the blood between the "chlorotic type" (showing a normal number or slight reduction of red cells, with a diminution in the percentage of hæmoglobin and little other change in the blood) and cases of well-marked von Jaksch's anæmia, with the profound changes in the blood together with the large hard spleen associated with this disease. He, like Czerny, does not favour the administration of iron salts. Both hold that excessive milk consumption plays an important part in anæmia in infants. Czerny believes that the saponification of a large amount of milk fat causes diminution in the alkaline reserve, and Kleinschmidt, while admitting that this view is not yet proved, is nevertheless of opinion that the anæmia is due to some toxic effect produced by the milk in the food. Both successfully treated the condition by greatly reducing the quantities of milk, replacing it by vegetables, cereals, fruit, and, if possible, meat, but very little fat. Kleinschmidt recognises, however, that such a diet contains much more iron than a milk dietary. He holds that "alimentary anæmia" occasionally results from excessive carbohydrate feeding, and attributes this also to a toxic effect. He does not think that anæmia invariably develops from a long-continued and exclusive milk dietary, but believes that its development is favoured by constitutional abnormalities and debility. In a recent publication from the Johns Hopkins Hospital, Evans and Happ[12] set forth evidence in favour of the view that secondary anæmia in infancy from a single cause may lead to a variety of blood pictures, the grade of change depending on the degree of strain thrown upon the blood-forming mechanism. So that they agree with Kleinschmidt that there is no clear line of demarcation between the "chlorotic type" of anæmia of infancy

of the French writers and other forms of secondary anæmia, among which they include splenic anæmia of infancy (von Jaksch's anæmia). It is clear, therefore, that opinions have differed greatly as to the cause, symptomatology, and treatment of anæmia occurring in infants given an exclusive milk dietary.

The Normal Blood Count in Infancy.

Different authorities, moreover, are not agreed concerning the normal blood count in infancy, especially with regard to the percentage of hæmoglobin. Holt's figures[13] for infancy represent views commonly held. Exclusive of the first few days of life, they are: Hæmoglobin, 65–85 per cent. ("75 per cent. a low limit in healthy children"); red blood corpuscles, 4–5½ million per c.mm.; white blood corpuscles, 9000–18,000 per c.mm. Finkelstein[2] puts the lower limit of hæmoglobin at 65 per cent.; Kleinschmidt[11] explains the differences of opinion concerning the range of the normal hæmoglobin percentage in infancy as largely due to the differing standard colour tubes used. It would seem that such a figure as 55 per cent. for the lower limit of normal (Aschenheim) must be due to the use of a standard colour tube differing considerably from those used by most workers. Many authorities place the normal red-cell count higher than does Holt—i.e., at 5 million or more per c.mm. (Kleinschmidt[11]).

Personal Observations.

The following observations are published because they demonstrate the extreme frequency of anæmia on cow's milk diets in a group of children living under excellent hygienic conditions. The results came as a surprise to me, and may, perhaps, be of use to others. The observations were made at the Meidling Hospital, Vienna, an institution under the charge of Dr. Egon Rach, and under the direction of Prof. Pirquet, head of the University Kinderklinik. The infants were admitted for an investigation concerned with the prophylaxis and cure of infantile rickets.*

(1) *Diets and Hygienic Condition.*—Two types of diet were in use. One was that in general use in the institution. It consisted of cow's milk with heavy carbohydrate additions. An infant until about 5 months of age was given full milk with the addition of 8·5–20 per cent. of cane sugar. From about 5 months old it received also increasing amounts of cereal, and at about 6 or 7 months small amounts of vegetable purée, usually potato, sometimes carrots or spinach. Fruit purée was usually given at about 8 months, biscuits about 9 months, bread between 9 and 12 months, and butter not till after 12 months. Eggs were given to a few of the older children. The total calorie allowance was high, and the amount of milk consumed daily at 5 months of age was usually over 1 pint. For older infants it was not less than this amount, and was usually nearer 1½ pints.

The other type of diet was a more exclusive milk dietary, so that larger quantities of milk were consumed. It consisted of milk (dried milk was used), with small additions of cod-liver oil. The total calorie allowance was somewhat smaller than in the case of infants on the first type of diet. The quantity of milk was often 1½–1¾ pints at 5 months of age, and older infants occasionally received nearly 2 pints daily for short periods. Before 8–9 months of age little or no added carbohydrate was given. All children on both diets received additional anti-scorbutic diet daily, from the time of admission, in the form of orange juice, tomato juice, or swede juice. The infants lived in well-lighted, airy wards. During the summer they were much out of doors, but during the cold Austrian winter they were indoors for weeks at a time.

(2) *Number and General Condition of Infants.*—The records include 36 infants. Twenty-five of the children were admitted under 3 months of age; at the time of the last observation, their age varied from 5½–21 months, 23 being over 9 months. The time in hospital varied from 4½ to 15 months. Three had rickets on admission, and nearly all were under weight at that time, but they were not suffering from acute illnesses. On the whole the level of general health was fairly satisfactory during the period of observation, though there were many minor intercurrent illnesses, such as colds in the head and otorrhœa. Six infants on the first type of diet developed radiographic evidence of rickets in the winter.

(3) *Percentage of Hæmoglobin.*—Approximately 220 hæmoglobin estimations were made with Haldane's hæmoglobinometer from blood collected from a prick in the heel; unfortunately they were not done at regular intervals, as their purpose at first was merely the comparison of infants on the two types of diet. In only three infants of this series was a complete blood count made—in these cases the red count was over 5,000,000 per c.mm. on every occasion, but there was a low hæmoglobin reading of 50 per cent. or less, and consequently a colour index of less than 0·5. The leucocyte count was 12,000–18,000 per c.mm., and the differential count was normal. There was slight polychromatophilia and poikilocytosis. In other words, there was marked anæmia of the so-called "chlorotic type."

Towards the end of the first year of life the majority of cases showed a drop in hæmoglobin, and 23 of the 36 infants had at some time less than 65 per cent. of hæmoglobin. Of 15 infants who were in hospital after 12 months of age, 14 developed a hæmoglobin percentage of 39–65 per cent., and of 23 infants in hospital after 9 months of age, 20 had at some time less than 65 per cent. of hæmoglobin, and 10 less than 55 per cent. Anæmia was generally first noticed between 9 and 12 months of age, but in several cases was well marked (50 per cent. to 60 per cent. of hæmoglobin) between 6 and 9 months of age. In only one child under 6 months of age was the hæmoglobin percentage under 65 per cent. This was a sickly, newly-admitted infant of 2 months, and the hæmoglobin percentage by 5 months of age had risen, with improvement in the general health, to 82 per cent.

These figures indicate that nearly all infants fed on the types of diet described developed anæmia at the end of the first year of life, in spite of good hygienic conditions and in many cases in spite of good general health. A number of infants, notwithstanding the low hæmoglobin content of their blood and their striking pallor, appeared to feel remarkably well and were extremely active. From the numbers observed there was no evidence that anæmia was more marked among infants on one type of diet than among those on the other, although one group of infants received cereal and vegetable additions to their dietary earlier than the other group. Possibly a larger number of cases might have revealed some difference. Eggs (½–1 daily), given for 3 to 5 months to a few infants, appeared to exercise no influence on the degree of the anæmia. Nor was the anæmia particularly associated with rickets; some cases who developed slight rickets had no anæmia, and in a case with no clinical or radiographic evidence of rickets the hæmoglobin fell as low as 39 per cent. There was no clear association between anæmia and so-called exudative diathesis (cf. Kleinschmidt[11]), nor with splenic enlargement. Only one of these cases had a definitely enlarged spleen, and in that case the degree of anæmia was slight. Cases with anæmia showed no tendency towards spontaneous recovery. There was in winter a progressive fall in the amount of hæmoglobin after the condition had developed. Outdoor life and summer conditions, with the resultant improvement in general health, did not bring about improvement in the blood condition in a single case in which anæmia had occurred, but in some cases the condition seemed to have been arrested.

(4) *Treatment.*—The form of treatment given was the administration of iron salts by mouth. The preparation used was ferri carb. sacch., 4½–9 gr. daily. The doses were given in the food and caused no digestive disturbance. Twelve infants received this treatment for from 1½–3 months, and seven showed

* See Studies of Rickets in Vienna, 1919–22, Medical Research Council, Special Report Series No. 77. A preliminary report of these investigations was published in THE LANCET, 1922, ii., 7.

a good response with increase of 14–38 per cent. of hæmoglobin, and were discharged with 64–77 per cent. of hæmoglobin. Improvement was not noted in any case until 3–4 weeks after treatment was begun, and in one case in which the percentage of hæmoglobin increased from 49–71 per cent. in 2¾ months no improvement was noted in the first six weeks of treatment. It is clear, therefore, that to give iron treatment a fair trial one must persist with it for a number of weeks. Of the remaining five cases, three showed an increase of hæmoglobin of 6–10 per cent., and were improving at the time of discharge, and two showed no improvement after 1½–1¾ months' treatment. Several of these five had been handicapped during the period of treatment by other causes, one had an operation for the removal of tonsils and adenoids, one had a pyrexial attack with tonsillitis and otorrhœa, and one was suffering from an X ray burn—the result of a previous unsuccessful attempt to treat the anæmia by radiation of the spleen. If the period of treatment had been longer, there is little doubt that further improvement could have been obtained in the majority of cases. Finkelstein[3] holds that at least three months' treatment should be given in every case, and says that there is no improvement in the hæmoglobin percentage in the first few weeks after the beginning of a course of iron treatment. None of the cases under consideration was treated by a reduction of the quantity of milk in the diet, so that no opinion can be offered as to this method of treatment. But the advocates of strictly dietetic treatment state that the complete change in diet is usually accompanied by a loss of weight, and often results in a refusal of food and a digestive upset (Kleinschmidt[11]), so that if the same object can be attained by the administration of iron without any untoward effects, there is no doubt that the latter would be the treatment to be preferred.

Prophylaxis.

More important than the question of treatment is that of prevention. The evidence available, in the opinion of the author, strongly supports the view that the anæmia is the result, in part at least, of iron starvation, but what other factor or factors play a part in its production is as yet uncertain. Milk contains very little iron; the infant is dependent on the store in its liver, and it has been shown that this store is very low by the end of the normal period of lactation (Bunge[5]). Thus, if the store is used too quickly, the child may well suffer from an insufficiency of iron during the first year of life, and this is likely to happen in an infant fed from an early age on cow's milk on account of the smaller percentage retention of iron in an artificially-fed child.

Attempts to produce anæmia in young animals by giving diets containing insufficient iron have not given consistent results (Kleinschmidt,[11] Hausermann,[14] Schmidt[15]), but have usually resulted in marked anæmia. In view of the recent advances in the technique of dietetic experiments on animals, much of the work of earlier writers appears now of lessened value, but the recent work of Happ[16] on young rats indicates that a diet containing insufficient iron (or for that matter a diet of cow's milk or cow's milk and bread) will not produce anæmia in these animals in the first generation, but that it may occur in the second generation. Possibly, therefore, an insufficiency of iron is only one factor producing "alimentary anæmia" in infants. Nevertheless, if iron starvation plays a part in such anæmias, the question of how the deficiency of iron in the diet is to be supplemented, and from what age this should be done, requires consideration. Finkelstein advocates the administration of fruit juice and vegetables from an early age—to premature infants from 4–5 months of age—but states that such a diet will not necessarily prevent anæmia in premature babies. Kleinschmidt is emphatic that mere supplementing of a milk diet with vegetables without marked reduction in the quantity of milk will not cure the anæmia. Small daily rations of vegetables given to many of the children at the Meidling Hospital from the age of 6 or 7 months did not prevent anæmia, and the giving of eggs to older babies appeared to have no beneficial effect on the amount of hæmoglobin. No evidence was obtained as to whether or not supplementing the milk dietary with any other foodstuff, for instance gravy or meat juice, would have proved prophylactic. In any case, it seems highly desirable that the question of prophylaxis should be further studied, and this the author hopes to have the opportunity of doing in the near future.

Most medical officers in charge of infant welfare centres must have been struck by the number of pale-faced babies attending. What proportion of these are truly anæmic can only be ascertained by examination of the blood, but the number must often be large. No doubt many of these anæmias are not primarily dietetic in origin, but if, as seems probable, one frequent cause is iron starvation, it would appear advisable to administer some form of iron salts as a drug to all such cases at an early stage, whether or not other treatment is given.

Summary.

1. There is a general consensus of opinion that too prolonged and too exclusive a milk dietary produces anæmia in infants and young children. This is probably due in part at least to iron starvation, on account of the low iron content of milk. Some writers, however, have held that it is directly connected with a toxic effect resulting from excessive milk consumption. Premature infants are known to be particularly liable to this form of anæmia.

2. In a group of 36 artificially-fed infants, receiving milk or milk and carbohydrate diets, with or without cod-liver oil, the majority developed anæmia. It was usually noted towards the end of the first year of life, but sometimes appeared as early as the seventh month. Additions of vegetables to the diet from 6 or 7 months old did not prevent anæmia. The infants were in well-lighted and well-ventilated wards, and were much out of doors in summer but very little in winter.

3. Treatment by the administration of inorganic iron salts by mouth brought about improvement in the majority of cases treated, but not in all, possibly because treatment was not continued for a sufficient length of time.

4. No improvement was noted in the hæmoglobin content of the blood in any case within three to four weeks from the beginning of treatment, and improvement might be delayed for six weeks with, thereafter, rapid progress.

5. It is suggested that many cases of anæmia in infants, particularly in those artificially fed from an early age, are probably associated with iron starvation, more especially as it has been experimentally demonstrated that the iron retention of an infant on cow's or goat's milk is much lower than on human milk.

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Reviews and Notices of Books.

A TEXT-BOOK OF THERAPEUTICS.

Including the Essentials of Pharmacology and Materia Medica. Sixth edition. By A. A. STEVENS, A.M., M.D., Professor of Applied Therapeutics in the University of Pennsylvania, Philadelphia; Visiting Physician to the University and the Philadelphia General Hospitals. London and Philadelphia: W. B. Saunders Company. 1923. Pp. 793. 30*s*.

THIS book is one which deserves to be better known in this country amongst students who have attained to house appointments and amongst all actively engaged in the practice of medicine. Of the books on treatment at present available which are at once comprehensive, up-to-date, and discriminating, it is one of the best we have met. It is divided into two parts, of which the first deals with the various therapeutic agents, their pharmacological action and method of application; the second part, occupying the last 250 pages, is a compact survey of the treatment of most acute and chronic diseases. A prominent feature is the inclusion of numerous prescriptions and a discussion of incompatible substances. In addition to the various pharmacopœial preparations mentioned, useful attention is given to a consideration of the better known proprietary preparations. The chief merit of the book, however, lies in its exposition of modern methods. There is a good account of C. Eggleston's views on the value of administering large doses of digitalis, and of the indications for and against the use of quinidine in heart disease; of Schleich's method of infiltration anæsthesia with local anæsthetics; of the Schick test and of Park's results with toxin-antitoxin mixtures in immunisation against diphtheria; of the treatment of amœbic dysentery with emetine-bismuth-iodide by the mouth; of Chandler Walker's method of treating bronchial asthma with specific proteins; of the Allen treatment of diabetes, which includes a table giving the protein, fat, and carbohydrate percentages in ordinary foods; of the Sippy treatment of gastric ulcer. Chapters, written with judgment and restraint, are devoted to electrical treatment, massage, the Nauheim treatment for chronic heart disease, X ray and radium therapy and the Finsen-light treatment. Turkish and Russian baths, hot packs, hypodermoclysis and gastric lavage are discussed.

A book of this kind should obviously be of great value, presenting as it does within one volume a critical account of so many matters otherwise only available in scattered papers.

There is surprisingly little to which exception can be taken. There is no mention of the treatment of tuberculosis by heliotherapy in climates where the high cooling power of the air makes prolonged exposure to sunlight possible; indeed, Prof. Stevens thinks that sanatorium treatment has been shown to be equally successful in all climates. The work done in this country during the war on the treatment of shock has hardly received adequate attention. While Bayliss's gum-saline is described in the chapter on infusion and hypodermoclysis, the author has nothing better to advise for shock than adrenalin and pituitary extract. Unless A. Krogh's recent work on the frog is to be taken as such an indication, there is as yet no evidence whatever that pituitary extract is of the slightest value in shock treatment; the defect is one of the capillary circulation which pituitary extract does not influence. Perhaps a more serious error occurs in reference to the use of pituitary extract in labour. Prof. Stevens states that when the os is fully dilated, in cases of uterine inertia, 0·5 c.cm. of pituitary extract may be given. It is not sufficiently realised how potent this remedy is, and text-book statements of this kind, if followed up, are bound to produce the opinion that the extract is dangerous; for such a dose is two or three times too great. Doses of from 0·1 c.cm. to 0·2 c.cm. of the ordinary 10 per cent. extract are amply sufficient for administration in the second or first stage; ignorance of this important point has led many conscientious obstetricians to neglect the valuable aid pituitary extract can give.

A dozen such criticisms, however, leave the main excellence of the book unimpaired; such points are inevitable when the net is cast so wide. The author is to be congratulated on having on so many sides and with so much judgment succeeded in presenting such an excellent work in the limits of one volume.

MULTIPLE SCLEROSIS (DISSEMINATED SCLEROSIS).

Being Vol. II. of the Series of Investigations and Reports of the Association for Research in Nervous and Mental Diseases. New York: Paul B. Hoeber. 1922. Pp. 241. $3.75.

IF the report on disseminated sclerosis by numerous distinguished American investigators does not yet solve the problem of the disease, it brings us somewhat nearer that desirable end. The reader familiar with the subject naturally turns to the sections dealing with the nature and ætiology of the affection, only to find that the Commission declares it extremely difficult to decide whether the disease is inflammatory or degenerative; in fact, they admit frankly they have not reached a conclusion on the question of the existence of acute multiple sclerosis as distinct from encephalitis or lues. They cannot regard the problem of a possible micro-organismal origin as either confirmed or unsubstantiated on histological grounds. It might appear as if we are farther off than ever from the solution of a common and widespread organic nervous disease. What is of value in this report, however, is the collation of an immense amount of data in reference to the geographical distribution, incidence, frequency, racial apportionment, and general ætiological factors of multiple sclerosis; the setting of the problem, we may say, is rendered more distinct thereby. The chapter on general and special symptomatology apparently omits any reference to the interesting group in which epilepsy is an early, sometimes the very first, symptom of the disease. There is an excellent bibliography, but the volume is sorely in need of an index.

THE COMMON NEUROSES: THEIR TREATMENT BY PSYCHOTHERAPY.

By T. A. ROSS, M.D., F.R.C.P.E., Medical Director, Cassel Hospital for Functional Nervous Disorders. London: Edward Arnold and Co. 1923. Pp. 256. 12*s*. 6*d*.

Dr. Ross opens by a survey of the many fashions that have come and gone in the theories and treatment of the neuroses—the exhaustion theory, with its rest cure, the "reflex" theory with treatment directed to the uterus, to minor refractive errors, to nasal spurs and deflections or to "dropped kidneys," and the still current toxic theory—and decides that enthusiastic if short-lived belief was the agent that removed symptoms. Drawing almost entirely upon his own experiences, of which 17 years were spent in general practice—a source of ample material for the study of neuroses—he demonstrates the psychogenic nature of these conditions and provides copious illustrations of his methods of treating them. He relies upon analysis, explanation, and persuasion

combined or as alternatives, and the frank accounts of his own difficulties and failures, together with a restrained tone throughout the book, are a welcome contrast to those optimistic writings upon psychotherapy which raise the suspicion that here, too, we may have only another phase of enthusiastic belief. His attitude towards psycho-analysis is not well defined. In the preface he takes the view, scarcely justified by a retrospective glance, that ten years ago the spell of Freud was so potent that the writings of Dejerine were unduly handicapped. Giving full credit to Freud's work and making free use of his methods, he employs the strange phrase, concerning the taking of a history, that "there is no taint of psycho-analysis about it" (p. 112). It is perhaps fear of this taint that makes him skim lightly over difficult problems. Sexual impotence, for example, cannot always be removed by reassurance, and the marriage of an impotent man, which he would allow (p. 110), is often followed by unhappy results; sexual frigidity in women, an equally potent source of unhappiness, or worse, is not mentioned. Dr. Ross's handling of the compulsion neurosis is weak, in both the treatment and the symptomatology of this important and often unrecognised condition. He shares the view, which possibly had origin in a mis-translation in an American edition of Freud's "Introductory Lectures," that analysis is contra-indicated in this neurosis, and describes his own failure in a patient of 49, who was "physically and psychologically a rather old man"; few psycho-analysts would have attempted the task in a patient of that age and type, but analysts claim most satisfactory results in properly selected obsessional cases, and Dr. Ross, in quoting Jelliffe, gives the unfortunate impression that the gloomy prognosis is orthodox.

These weak points, however, detract but little from the usefulness of the book to the general practitioner, for whom it is written and to whom it may be cordially recommended.

MEDICAL DIAGNOSIS.

Fifth edition. By CHARLES LYMAN GREENE, M.D., formerly Professor of Medicine, University of Minnesota and Chief of Medical Clinic in the University Hospitals. London: William Heinemann. 1922. Pp. 1453. 63*s*.

THE new edition of this work contains 75 new illustrations and an additional 150 pages. More than half of the new matter is included in the section dealing with disorders of the heart and blood-vessels to which Prof. Green devotes particular attention, the many facsimiles of electro-cardiograms being very valuable. We doubt whether all readers will agree with his remarks on "drop heart," and feel that auricular flutter should be included in the classified list of arrhythmias on p. 543, but otherwise we find this section illuminating. The vast amount of information in the book is made readily accessible by the excellence of the indices as well as by the provision on each page of a margin containing terse epitomes. The author's descriptions of the latest tests and aids to diagnosis, and his reasoned and moderate view of their individual value enhance the value of the work which, if too comprehensive for students, forms an excellent text-book of diagnosis.

CYSTOSCOPY AND URETERIC CATHETERISATION.

Traité pratique de cystoscopie et de cathétérisme urétéral. Second edition. By G. MARION, Professeur agrégé à la Faculté, Chirurgien de l'Hôpital Lariboisière (service civile); and M. HEITZ-BOYER, Professeur agrégé des voies urinaires à la Faculté, Chirurgien de l'Hôpital Saint-Louis. Paris: Masson et Cie. 1923. Pp. 480. Fr.100.

IN the second edition of their book on Cystoscopy MM. Marion and Heitz-Boyer have not changed the general arrangement of the work. They have, however, entirely rewritten the chapter dealing with the optical principles involved and with the interpretation of images; and they have now given less space to the discussion of direct and indirect (or reversed) images, for as they justly remark, urinary surgeons should be equally conversant with both methods. One chapter is new and deals with urethrocystoscopy as first described by Buerger. Many additions have been made in the chapters on pyelography, the estimation of renal efficiency, and cystoscopic operations. It is of interest to note that these surgeons prefer the high-frequency spark to the diathermy current as employed in this country, believing that the former is more exact and more easily controlled.

The second edition should appeal to an even larger number of the profession than the first. It is admirably written, and has the advantage of being based on the personal experiences of two well-known genito-urinary surgeons. It contains in all 60 plates, mostly in colours, of cystoscopic findings, described in no less than five languages.

SELECTED PAPERS AND ADDRESSES.

By WILLIAM WILLIAMS KEEN, M.D., LL.D., Emeritus Professor of Surgery, Jefferson Medical College of Philadelphia. Philadelphia: George W. Jacobs and Co. 1923. Pp. 340.

Prof. Keen is well known on this side of the Atlantic as the doyen of surgery in the United States, and his book shows that he can write lucid and literary English with something of that indefinable quality which pervades the writing of John Brown of the "Horæ Subsecivæ." The papers and addresses were written at various times and upon different occasions, and therefore, as Prof. Keen implies in his preface, are not necessarily to be taken as setting forth the present-day opinions of their author. Some of them, however, deal with matters which are as permanent as anything can be in this world of flux, as, for instance, the paper upon the conditions of surgery before and after Lister; that upon the benefits not only to human beings, but also to the lower animals derived from experiments upon animals; and that entitled "Things Surgeons Stand For."

Other papers deal with the Service of Missions and with the impossibility of a war between Great Britain and the United States. Altogether the collection is a satisfying one which should be read and pondered not only by medical men, but by all who have the welfare of humanity at heart.

GENERALISED PAIN.

Being Part II. of the Clinical Symptomatology of Internal Diseases. By Prof. Dr. NORBERT ORTNER, Vienna. Authorised translation by FRANCIS J. REBMAN. With an introduction by THOMAS WEBSTER EDGAR, M.D., New York. New York: Medical Art Agency. 1922. Pp. 596.

To analyse and describe all the varieties and causes of pain in the body generally, from scalp to toes, is an ambitious project; to carry it out with any degree of success is matter for congratulation. We think Prof. Ortner has reason to pride himself on the attainment of his object, for only a physician with some knowledge of all the specialties can possibly hope to accomplish the task in anything like an adequate fashion. Pain in the heart, back, neck, shoulder, chest, head, muscles, bones, joints, and extremities demands for its investigation the erudition of a universal specialist, if such there be. We have scanned these pages with pleasure and profit, and are amazed at the range of clinical knowledge of their author. No one can quarry into this material without finding something with which he was not familiar. We can hardly compliment the translator on his style, though in an introduction the reader is assured that clear and simple English has been chosen. Apart from a large number of misprints, misspellings, and mistakes ("a wattling gait," "plyocytosis," "parosnia" and "pareugesia," "ischimia," "Bamberg's

phenomenon in tabes," "motoric aphesia," &c.), we regret that the author's meaning should thus suffer in careless translation: "diseases of the brain occupy the area of the trigeminal nerve which is the original habitat of paræsthesias" (p. 281); "I do not refer to the sensible aura of epilepsy" (p. 330); "bitemporal contraction of the face (hemianopsia)" (p. 287), &c. The English rendering becomes ridiculous when we are told that varicose veins cause "edema of the knuckle." Many unfamiliar expressions—"Wolhynian fever," "Sudek's atrophy," "Pappataci fever," "malum Rustii," "Bruck's disease," "Jack's disease" (can this be von Jaksch's disease?), "pyrgocephalus," &c. occur. For those, however, to whom the original is not accessible even an indifferent translation will be acceptable.

SURGICAL DIAGNOSIS.

Exploration clinique et diagnostic chirurgical. By FELIX LEJARS, Professeur de Clinique Chirurgicale à la Faculté de Médecine de Paris; Chirurgien de l'Hôpital Saint-Antoine; Ancien Président de la Société de Chirurgie. Paris: Masson et Cie. 1923. Pp. 778. Fr.60.

IT is a charge frequently levelled at the present generation that its powers of diagnosis are vastly inferior to those of its forefathers. The charge can be easily answered, but no one denies that there exists room for improvement in this most difficult department of medical science. None will gainsay the existence of "clinical instinct," but this does not imply that diagnostic ability may not be acquired. How then may it be taught? We believe that an exhaustive, exact, and intelligent examination of the patient, combined with a judicial review of the history, will enable the student often to make accurate diagnoses, without having continual resort to multiple laboratory tests. It is for this reason that we welcome this book.

Prof. Lejars has set himself to describe a precise technique for the examination of every kind of pathological condition in every part of the body. He has succeeded in so doing in a concise manner, and has been aided in making his meaning easily understood by a very large number of illustrations. The style in which the book is written may not appeal to some in this country, and the reproductions of the X ray photographs are in most cases poor, but there can be no doubt that it is a book of great value and should appeal to a wide circle.

THE EVOLUTION OF MAN.

A Series of Lectures delivered before the Yale Chapter of the Sigma Xi during the Academic Year 1921–22. Edited by GEORGE ALFRED BAITSELL. London: Humphry Milford, Oxford University Press; New Haven: Yale University Press. 1923. Pp. 202. 15*s*.

THERE are six lectures included in this book, with a bibliography and index. The subjects of the lectures are the Antiquity of Man, the Natural History of Man, the Evolution of the Nervous System of Man, the Evolution of Intelligence, Societal Evolution, and the Trend of Evolution. The authoritative nature of the statements made is assured from the names of the collaborators, Profs. R. S. Lull, H. B. Ferris, G. H. Parker, A. G. Keller, E. G. Conklin, and President J. R. Angell. It is evident that the book is not intended for specialists in the various departments with which it deals, but rather for those others who desire acquaintance with what is being thought and said in the biological world and laboratories. We have read the book with very great pleasure, for the lectures are not only authoritative but are phrased in clear and simple language. The earlier lectures are clearly illustrated. We can heartily recommend this work to the medical man who has little time to spare but wishes to know how matters evolutionary stand to-day. The volume is handy and well produced.

SURGICAL ANATOMY OF EMERGENCY OPERATIONS.

Topographische Anatomie dringlicher Operationen. Second edition. By J. TANDLER. Berlin: Julius Springer. 1923. Pp. 118. 8*s*. 4*d*.

IN this book the surgical anatomy of emergency operations is considered and the steps of each procedure set forth. The descriptions are clear and the many very beautiful illustrations self-explanatory. In a book devoted to anatomy only one naturally looks for an account of variations in the typical relations of the structures in the gastro-hepatic omentum, a subject of great importance to the surgeon. But this does not appear, probably because the author is an anatomist and not a surgeon. The latter gets the impression at operations that the cystic artery rather more commonly passes behind than in front of the common bile-duct, as depicted on p. 67. By a printer's error, the structures shown in Fig. 54 have been wrongly labelled. The oblique lumbar incision for exposing the kidney is described, but when, in an emergency, a bilateral nephrotomy or decapsulation has to be performed, the Mayo approach, which is not mentioned, is simpler and quicker.

VISCEROPTOSIS.

Les désanglés du ventre; Maladies par relâchement des parois et organes abdominaux. By Dr. CHAUVOIS. Paris: A. Maloine et Fils. 1923. Pp. 167.

IN this little book Dr. Chauvois described the varieties and results of atony of the abdominal wall, with its effects on the abdominal viscera. The illustrations are an important part of the work, being for the most part arranged in pairs to show the clinical types under discussion side by side with types of healthy and well-built subjects. Full recognition is given to the writings of Glènard, and the author has made no attempt to cover every aspect of his subject; technicalities are avoided, for Dr. Chauvois appeals not only to medical men, but also to lay people, and especially parents. With this object, in the chapters on treatment the greatest prominence is given to the early stages of the disability and to its prevention, particularly in childhood. Methods of general hygiene, and the value of correct abdominal supports, fresh air, baths, athletics, and special breathing and gymnastic exercises are described. In England we have been rather in advance of France in these matters, but abdominal atony is only too common, and this book is of considerable educational value; its main practical defect is that insufficient attention is directed to the importance of looking for and eradicating any focus of sepsis, in children especially, for this is the primary cause of the lethargic habit in very many cases.

SURGERY.

Grundriss der gesamten Chirurgie. Second edition. By Prof. Dr. ERICH SONNTAG, Vorstand des Chirurgisch-poliklinischen Instituts der Universität, Leipzig. Berlin: Julius Springer. 1923. Pp. 937. 11*s*. 8*d*.

THIS book is written in the form of a synopsis of general surgery. It is well arranged and classified under suitable headings for the various systems, and could be used by students as a "crammer" for revision before examinations, or by the practitioner for reference in times of emergency. To literary style it makes no pretence, and it confines itself to the orthodox teaching of the day, without attempting to present or to solve any of the numerous controversies with which modern surgery abounds. The book includes a short chapter on operative surgery, which, while necessary for the completion of the work, is almost too short and sketchy to be of much practical value, more especially as it lacks illustrations. The fact that a second edition has appeared is sufficient evidence that the book is in demand and fills a definite place in the literature of its kind.

SIXTH CONGRESS OF THE INTERNATIONAL SOCIETY OF SURGERY.

(*Concluded from p. 147.*)

WEDNESDAY, JULY 18TH.

Arthroplasty.

Mr. E. W. Hey Groves (Bristol) defined arthroplasty as an operative procedure upon an ankylosed joint with the object of restoring mobility. The pseudo-arthrosis occasionally resulting from an ununited fracture proved that the formation of a new joint with adapted articular surfaces and a capsule and synovia was within the powers of nature, yet the results of attempts to form a new joint by operation were variable and not always successful. Mobilisation of the elbow by some form of operation was usually successful, while arthroplasty of the hip and knee was frequently disappointing. The conditions most favourable to arthroplasty were bony ankylosis due to trauma or long cured pyæmia and occasional cases of osteo-arthritis and tubercle. The essential operative procedure in arthroplasty was the making of a gap between the articular ends, which gap must be maintained until healing took place; shaping and covering the articular ends was useful but not essential. Continuous traction on the new articulation and early voluntary movement were most necessary in after-treatment. In the elbow the suitable cases were those of bony ankylosis free from active infection, except those in which a strong useful arm was present in a labouring man. He considered that the best operation for the elbow was to preserve the whole width of the humeral condyles and to cover this bone with a free flap of fascia lata. In the hip there were three different types of operation to be considered: (1) For simple ankylosis an osteotomy of the neck of the femur with interposition of a flap taken from the fascia or from the capsule; (2) for massive hypertrophic ankylosis, a subtrochanteric osteotomy with the interposition of a fascial flap, forming a saddle-shaped joint; (3) for osteo-arthritis, excision of the head of the femur. In the knee any operation was unjustified if the joint were fixed in a good position, and it was only in the case of ankylosis of both knees that arthroplasty should be considered. The essential points in any such operation were the use of free fascia to cover the lower end of the femur, the preservation of the lateral ligaments, and the use of a jointed knee-cage for some months afterwards. If lateral mobility persisted, then the lateral ligaments must be reinforced by a second operation.

Prof. V. Putti (Bologna) gave his experiences gathered from 142 arthroplasties, the first of which was performed 10 years ago. He pointed out that arthroplasty was a severe and traumatising operation, and depended much for its success upon the coöperation of the patient in the after-treatment. It should therefore be reserved for patients of good vitality between 20 and 50 years of age, whose mental condition was good in that they were neither hypersensitive nor neuropathic. The profession of the patient was also important; in certain callings strength was preferable to movement. Bony ankylosis gave better results than fibrous: the ankylosis following acute infective arthritis (especially when the result of war wounds), polyarticular arthritis and certain cases of osteo-arthritis of the hip, and, rarely, of tuberculous arthritis were indications for arthroplasty. Operation should not be performed until after the lapse of a year from the time of the last acute manifestations. Ankylosis of the temporo-maxillary joint, bilateral ankylosis of the hip-joints, and ankylosis of the elbow in extension were all absolute indications. In the knee equally good results could be obtained as in the elbow. The operation consisted essentially of the partial resection of the joint which should be neither too extensive nor too sparing, and the exact fitting of the articular surfaces by means of gouges and files. The raw bony surfaces were then covered by free flaps of fascia lata, sewn into position, and the joint reconstructed by careful suture of the muscles, &c. Extension was kept upon the joint after the operation, and free use was made of active hyperæmia induced by radiant heat. Movements were begun by the patient in 12 to 15 days. After arthroplasty of the lower limb the patient should be able to walk within a month. The new joint was gradually and slowly developed as the result of use; the action of the flaps of fascia lata was merely temporary, but they were very helpful in the early stages. He had occasionally found it necessary to open one of these new joints some years after arthroplasty, when he found a condition strongly resembling the normal articulation. Movement was painless, and tended to increase with time rather than to decrease; the new joints were not affected by osteo-arthritis, but remained functionally good after many years of use. After delivering his report Prof. Putti showed cinematographic records of arthroplasty of the knee, showing all the details of the operation, the after-treatment, and the results. He concluded by exhibiting four cases in whom he had performed arthroplasty of the knee for bony ankylosis following war injuries. All four had a range of at least 90° of flexion from full extension (without undue lateral movement) and walked normally; it is worthy of remark that all were still serving in the Italian Army and doing full duty, two of them as officers.

Dr. W. R. MacAusland (Boston, U.S.A.) discussed the present position of arthroplasty, and pointed out in what respects it differed from mobilising excision. After a brief reference to the pioneer work of Baer, who used chromicised pig's bladder for interposition, and of the late J. B. Murphy, who developed the use of a pedunculated fat flap for the same purpose, he described the use of free fascia lata flaps after the method of Putti and Peyr, which had given the most uniformly successful results. Dr. MacAusland's report was lavishly illustrated with drawings and photographs, showing the technique and results of arthroplasty in the various joints in which he had found the operation of arthroplasty useful, notably the elbow-, hip-, and knee-joints, and cinematograph pictures were shown at the meeting of the operation of arthroplasty upon the elbow-joint. Access was gained to the joint by severing the olecranon process, and the remaining details of the operation resembled those of Prof. Putti's arthroplasty of the knee, except that only one bony surface (that of the humerus) was covered by the fascia lata flap. As a result of the operation, about 100° of movement could be obtained; in the earlier cases this was from full extension, but more recently he aimed at a range of from 45° to 145° (full extension = 180°), which he considered more useful. In considering the indications for arthroplasty, the speaker agreed broadly with those who preceded him, but he laid special emphasis upon the necessity for reserving arthroplasty for joints in which the muscles were still in good condition. The joints which gave the best results were the elbow, hip, and knee.

Dr. P. Santy's (Lyons) contribution was read by Dr. R. Leriche. Dr. Santy said that surgical mobilisation of ankylosed joints had so far been little used in France, probably because they continued to use Ollier's mobilising resection in certain cases. In the shoulder, elbow, and wrist Ollier's technique gave excellent results, but to obtain them great tenacity and patience was required, not only of the surgeon, but also of the patient during the weeks of mobilisation, while the articulation adapted itself to the neoarthrosis. Arthroplasty was, however, undoubtedly an improvement in technique, and hastened results. For the hip, mobilising resection was sometimes indicated, for example, in the case of large bony fusions where surgical modelling and interposition was difficult. Apart from these cases, arthroplasty was again an advance in treatment.

Arthroplasty had, in fact, created a new chapter in surgery.

Dr. Leriche gave it as his own experience of 25 cases of ankylosis of the elbow, 15 of which had been treated by Ollier's method and the remainder by arthroplasty with interposition, that the results of the former were at least as good as those of the latter. After seeing Dr. Putti's results, however, there could no longer be any doubt that arthroplasty of the knee was preferable to a stiff joint in the best position (full extension), which was at times very inconvenient to the patient.

DISCUSSION.

Sir William Macewen (Glasgow) pointed out that flail joints did not result from the old-fashioned excision provided the resection were kept within the limits of the capsule. The function of the interposed flap he believed was to limit the growth of bone from the raw bony surfaces; it was more important when the diaphysis was involved on account of the greater osteogenetic power of the diaphysis as compared with the epiphysis. He thought that movement might have been improved in some of the cases by a larger resection of bone. Dr. Putti's arthroplasty of the knee was undoubtedly a great advance in surgery.

Mr. R. C. Elmslie (London) considered that a knowledge of when to perform arthroplasty was more important than skill in the technique of the operation. One stiff joint might be very little disability; he knew of cases with an ankylosed hip who could walk ten miles, whereas a mobilised joint might be a great disability if, as sometimes happened, it were painful. Double ankylosis of the hip might call for a mobilising operation on one side, but as a rule arthroplasty was more often indicated in the upper than in the lower extremity. In respect of the shoulder arthroplasty failed to reproduce the complicated movements of the joint. In the elbow he obtained very satisfactory functional results by an excision, shaping the olecranon and preserving the triceps, without any flap interposition.

Sir W. I. de Courcy Wheeler (Dublin) said that arthroplasty of the shoulder was only indicated when scapular movement was deficient; bony ankylosis was better for a working man. It was unfortunate that no satisfactory results had yet been obtained from arthroplasty of the finger-joints; following Murphy, he had tried the interposition of discs of cartilage, but without success. He had performed successfully a double arthroplasty of the knee, but was cautious in advising the operation. Since early painless movement was necessary if a new joint were to be formed, he urged the necessity for excision of all remains of capsule and ligaments which carried nerves. In the hip he had been disappointed with his own results, although he had seen many encouraging results of others. Finally, he described the operation of cheilotomy (the resection of osteophytic masses) as having given astonishingly good result in osteoarthritis of the hip.

Dr. Jiraseck (Prague) gave the results of 25 arthroplasties at Prof. Kukula's clinic. The interposed flap consisted of omental fat in 9 cases, of subcutaneous fat in 7 cases, and of fascia lata in 9 cases. The most successful cases were in the elbow (88 per cent. successful) and knee (77 per cent. successful), while the one case of arthroplasty of the hip failed. Re-ankylosis, when it occurred, was due to the return of suppuration, or to lack of cöoperation on the part of the patient.

Dr. Villandre (Barcelona) described his results in arthroplasty of the jaw and elbow, and illustrated them by lantern slides.

Mr. R. A. Stoney (Dublin) considered arthroplasty unnecessary where excision gave a good movable joint. In the elbow in cases of war wounds he had obtained good results from excision (limited as regards the bones of the forearm, but more radical as regards the humerus), being careful to preserve the attachment of the triceps to the periosteum. The cavity left was packed with "bipped" gauze and later allowed to close by granulation.

Dr. T. Tuffier (Paris) found that the greatest difficulty in performing Putti's operation on the knee was to obtain and preserve the right gap between the new articular surfaces. To obviate this he employed a pair of jointed steel plates attached to the femur and tibia by screws; this was allowed to remain in place for about a month, during which it allowed of movements and abolished the need for extension. It was then removed under local anæsthesia.

Drs. Corachan (Barcelona), Zahradnicky (Prague), Ribas y Ribas (Barcelona), Puiz y Sureda (Barcelona), and Juracz (Posen) also spoke.

On Wednesday evening the members of the Congress were entertained at a reception by the Lord Mayor and Lady Mayoress at the Mansion House.

On Wednesday afternoon, at an "unofficial" meeting, Dr. Serge Voronoff (Paris) gave a further demonstration on the subject of testicular grafting, illustrated by cinematograph pictures of his experimental work on rams and goats, and of the results obtained in man. Dr. Pauchet (Paris) described the technique of blood transfusion, and also illustrated the methods employed by cinematograph pictures.

THURSDAY, JULY 19TH.

Nerve Injuries.

Dr. P. Henriksen (Skien) discussed the results of surgical treatment of injury of the nerves. He said that after a nerve had been cut with a sharp instrument the peripheral nerve tended to heal spontaneously without leaving any permanent injury. Sensibility reappeared as soon as there was contact between the nerve ends, and mobility after about two months. After a nerve had been sutured, function developed in the same way as in spontaneous healing if the suture had been correctly performed. But healing might not take place if fat were interposed, or if infection resulted. After secondary suture, sensibility appeared at once and mobility and the reactions to electrical currents might occur after two months, and develop as after primary suture. If the nerve were subjected to blunt force, such as crushing or tearing, the neurilemma nuclei were injured and some completely destroyed, so that part of the newly formed nerve fibres were not capable of living and degenerated. When the neurilemma nuclei were totally destroyed no new nerve fibres were formed and the nerve atrophied. The changes were most marked at the actual spot where the crushing took place, and the nerve was adherent to surrounding tissue. Improvement might be obtained in some instances by freeing the nerve from adhesions. The best method seemed to be to resect the thickened fibrous part. The degree of function secured then depended on the general state of the nerve.

Prof. A. Gosset (Paris) thought that the following cases of nerve wounds should be operated on:—

(*a*) *Cases of Progressive Compression Causing Serious Irritation or Interruption.*—In these types liberation could not injure the patient or the nerve, and he saw no advantage in delaying the operation.

(*b*) *All Cases of Complete Interruption.*—These should be clinically examined by competent neurologists, and if they showed no sign or regeneration, or showed signs of useless regeneration, should be operated on.

(*c*) *All Cases of Causalgias or Serious Neuritis.*—There was, however, no fixed rule for this latter type.

He said that war surgery had shown us that we should certainly, during the preliminary surgical cleaning of the wound, examine the state of the important vessels and nerves. This was still more necessary if from the first day there were signs of paralysis of a large peripheral nerve trunk. Any severed nerve should at once be stitched up to allow of rapid regeneration, and, moreover, to avoid formation of fibrous

tissue. When the nerve was bruised, it seemed best to preserve it and keep it under constant observation. When some time had elapsed before the patient had received medical attention, the lesion should be operated on as quickly as possible. Aseptic operation, however, was essential, and it might be necessary to wait some weeks until all signs of suppuration had disappeared. As regards the operation to be done, Prof. Gosset thought that in the case of nerve compression with signs of irritation, simple liberation was all that was necessary. Intra-nervous extraneous bodies should always be taken out, but small intrafascicular fibromata should be enucleated only when the operation was without danger to the healthy nerve bundles. If there were interruption in the continuity of the nerve which showed no improvement after several examinations, resection of the fibrous callus and suture of the neurilemma should be undertaken. If suture were impossible, a graft, or the dividing into two of the lower end, should be practised. Good results would only be obtained if the patient had been kept free from ankylosis and muscular contracture during the time preceding the surgical treatment. Experience had shown that the period of regeneration might extend from 18 months to several years.

In conclusion, he said that in war surgery, as well as in civil surgery, immediate suture of the nerves should usually be completely successful. If surgical treatment had been delayed from one month to two years, good functional results might occur in 40 to 50 per cent. of the cases. Even after this time treatment should be tried; it might be successful, but there was less chance. Nevertheless, it was his opinion that the surgical treatment of the big nerve trunks is by no means illusory if it were carefully practised by skilled specialists, and if the patient could be kept under prolonged observation.

Dr. Charles H. Frazier (Philadelphia) discussed the results of 3000 gunshot wounds of the peripheral nerves treated in the Reconstruction Hospitals under the control of the Surgeon-General's Office, U.S.A. Of these, about 2400 involved important nerves and 1800 were submitted to operations of various kinds, suture, lysis, or nerve transplants. Experience having shown that spontaneous recovery might take place up till six months after the injury, it was usual to delay operative procedure until the end of that period; further experience showed that successful suture could be performed after a lapse of two years. In three-quarters of the operations the procedure adopted was resection of the ends and suture; the technique was similar to that employed in other countries, and the actual resection tended to become more extensive with greater experience of the operator. Partial resection with suture was a delicate operation not often performed. When the resection had been so extensive that the ends could not be got together by any manœuvre, such as transposition, he favoured a two-stage operation rather than "bridging" with a graft, since the results of the latter had, with only a few exceptions, been uniformly unsuccessful. As regards the quality of recovery from resection and suture, it was rarely perfect, and the question of the bearing of the intraneural plexuses on this elicited divergent views in America. It was difficult to account for the high percentage of failures in certain nerves—e.g., external popliteal. Neurolysis failed in 26 per cent. of cases. Finally, he considered that the results in these nerves were sufficiently good to warrant the re-exploration and suture if possible in cases of complete lesions of the median, ulnar, musculo-spiral, and sciatic. A complete statistical survey of the end-results was unfortunately prevented by the transference of the control of the cases to many different departments.

The Late Results of Surgical Interrention for Traumatic Lesions of Nerves.

Dr. A. Chiasserini read a paper by Dr. G. Verga (Pavia) who died recently. The part played by Italy in the study of the surgery of the peripheral nerves had been very important from a scientific point of view, thanks to the fundamental researches on the regeneration of nerves carried out at the Laboratory of Histology and General Pathology at the Royal University of Pavia, under the direction of Prof. Golgi. Dr. Verga himself had published the clinical results of 212 interventions on nerves (1916–18). It was only in a small minority of cases that we could obtain perfect recovery after surgical treatment. In a great many cases, considered to be successful, there was something lacking as regards sensibility or electric reactivity, or, perhaps, motility; in the latter case the operated limb was weaker and more easily tired. Usually the process of restoration of function stopped when only a more or less relative improvement was obtained. The precise estimation of the functional restoration of an operated nerve was always a delicate and difficult problem, and should only be undertaken by an experienced neurologist, who could have the cases under observation for a long time after operation. The percentage of improvement and recoveries obtained by Dr. Verga in 82 cases observed for over a year was (i.) recoveries, 52·4 per cent.; (ii.) improvements, 37·8 per cent.; (iii.) negative results, 9·7 per cent. He had included amongst the recoveries cases where a slight loss of strength or of function of the limb had been observed, and amongst the improvements all cases where, after operation, any favourable modification of the symptoms was manifest. Out of nine cases observed up to six and a half years after operation, only in one was a change for the worse observed. In all cases improvement had been the rule; this showed, he thought, that improvement is a question of time. The results obtained by suture and neurolysis were much superior to all other operations for making good great losses of nervous tissue. These other operations, however, should not be entirely condemned, because some of them, especially grafting, might give good results, but recourse should only be made to them where other means failed.

True End-results of Nerve Suture.

Mr. H. Platt (Manchester), who read a summary of a paper by himself and W. R. Bristow, said that the results of nerve suture had fallen short of expectations, as was shown by an analysis of the true end-results in 157 cases now published for the first time by Prof. J. B. Stopford. (See table on p. 174.)

The mere punctual appearance of the first signs of recovery was no indication that complete restoration of conductivity would eventually occur, and even in the very best results there was some departure from the normal. The most successful cases were those obtained in the musculo-spiral nerve, but even here the synergic action of the extensors of the wrist when "making a fist" rarely recovered. The median and ulnar nerves had both given disappointing results, the important sensory function of the former never having been completely restored. In the sciatic nerve the results again were poor; no case of recovery of the intrinsic muscles of the foot was recorded, and the type of sensory recovery had been defective, often leading to painful traumatic ulceration of the foot, for which amputation was sometimes demanded. *Neurolysis* (freeing or liberation of the nerve) when practised early, before the compression had resulted in degeneration of the axis cylinders, had given rapidly successful results in the return of both sensory and motor functions. But where the compression had been in existence for a long time the restoration of function depended upon regeneration of the axis cylinders through the interior of a nerve trunk, the seat of an interstitial fibrosis, and was therefore generally very incomplete. Nevertheless neurolysis was often a legitimate experiment to be followed by resection and suture at a later date, if signs of recovery did not ensue. *When nerve-suture failed*, an alternative procedure available in certain cases was tendon transplantation; this had been employed chiefly for musculo-spiral lesions, the pronator radii teres, flexor carpi radialis, and flexor carpi ulnaris being transplanted into the extensors

RECOVERIES SEEN IN TRUE END-RESULTS—157 SUTURE OPERATIONS.

Grangethorpe Hospital, Manchester.

Nerve.	Number of operations.	Motor function.					Sensory function.			
		Proximal muscles plus distal muscles (total) (complete motor recovery).	Proximal muscles plus distal (partial).	Proximal muscles alone.	Distal muscles.	No motor recovery.	Protopathic recovery alone.	Protopathic plus epicritic (partial).	Sensory complete.	No sensory recovery.
Musculo-spiral ..	37	20	16	1	—	—	—	—	—	—
Ulnar—	38									
Upper arm	19	None.	12	7	—	—	9	4	None.	6
Forearm	19	—	—	—	Hypothenar alone 8. Hypothenar and 1 other, 9. 1st dorsal interosseous 1.	1	6	9	1	3
Median—	43									
Upper arm	22	None.	7	15	—	—	11	6	None.	5
Forearm	21	—	—	—	9	12	9	10	None.	2
Sciatic	27	None.	None.	27	—	—	16	6	None.	5
				I.P. and E.P. muscles 20 I.P. alone 7.			Incomplete 14. Complete 2.			
External popliteal ..	12	—	—	6 complete 6 incomplete.	—	—	6	None.	4	2

of the wrist, thumb, and fingers. Two cases where this operation had been practised were exhibited.

Nerve-grafting.

Mr. W. R. Bristow (London) continued the joint report. "Nerve-grafting" (i.e., the bridging of a gap in a nerve after resection or from injury with a portion of nerve obtained from the same or another individual) must be regarded as a last resort; every effort should first be made and every device employed to obtain end-to-end suture. Many claims to success from grafting had been examined by the Medical Research Council and all had failed to convince. Most of the claims were based on the presence of "trick-movements"; thus with a complete median lesion the patient often learnt to flex the wrist by means of the extensor ossis metacarpi pollicis. Microphotographs showing the results of nerve-suture were then shown. It was pointed out that interstitial fibrosis due to an ascending toxic neuritis was demonstrable in one section two and a half inches proximal to the end bulb; in such a case it would be impossible to excise all the damaged nerve before suture, and this explained the frequency of partial or total failure in suture of war injuries. A section of a "nerve-graft" removed three and a half years after implantation was also displayed which illustrated the reaction around a stitch and showed the total failure of axons from the central end to grow into the substance of the graft. Another section of nerve obtained from a limb amputated for pain showed demyelination. Drawings of microscopic sections of muscle (1) after two and a half years denervation; (2) in ischæmic paralysis showed that in the former, in which recovery was still possible, the transverse striation of the muscle fibres was lost and fibrous tissue increased, while in the latter the sarcolemma nuclei had disappeared and the muscle fibres were beyond recovery. Finally, he pointed out that the joint report was based upon the results of war injuries, and that the results of suture of nerve injuries in civil practice, where sepsis should not play so large a part, should be much better.

DISCUSSION.

Dr. R. Leriche (Lyons) discussed causalgia, which he had found was not infrequently associated with a gross arterial or nervous lesion, although sometimes no such lesion was to be found. That causalgia was not psychic in origin was proved by the fact that cases which originated in 1914 or 1915 were still suffering in spite of the end of the war, and by the occasional occurrence of causalgia in civil injuries. While causalgia was the result of a peripheral lesion operation was successful, but as soon as the lesion had spread to the nerve roots or the cord operation was less successful. Believing that pain was carried by the sympathetic nerves, he had performed exsection of the sympathetic in nine cases, with five good results, two improvements, and two failures. Primary exsection of a portion of the involved nerve trunk had been performed three times, with one cure and two failures. In the cured case subsequent suture was performed, but the result was not seen as the patient died of another malady; 17 late exsections gave only one success. Sympathetic exsection was only useful for cases of functional disturbance, unassociated with demonstrable anatomical change.

Mr. Archibald Young (Glasgow) held a brief for the value of a sheath (either of vein, fat, or muscle) around a sutured nerve; 33 cases in which he had employed such a sheath, when contrasted with others in which no sheath was employed, showed a higher standard of recovery. The bed of a sutured nerve was also important; he considered displacement from its original bed to be an important part of the technique of nerve-suture. He had had some success with nerve-bridging.

Dr. A. Chiasserini (Rome) agreed that end-to-end suture gave the best results, but claimed to have had a success from the implantation of a graft preserved in alcohol in a case where the median nerve was severed in the forearm. The sensory recovery was good, and the motor recovery moderate. He then gave details, illustrated by lantern slides, of experimental work on nerve-grafting in dogs. The best results were obtained with autogenous grafts, but good results accrued from homogeneous. When removed some months later the nerve appeared almost normal, and histologically nerve fibres could be traced through the graft, especially in its periphery, to the distal end. Such nerves responded to faradisation. Wrapping the suture line at the primary operation was wrong, but might be useful as a secondary measure when adhesions were preventing the growth of the nerve fibres along the periphery. He concluded that the almost universal failure of nerve-grafts in man was due to faulty technique.

In the afternoon the Royal College of Physicians was opened to members of the Congress, and there was an exhibition of specimens of surgical and anatomical interest.

On Thursday evening a reception was held at the Royal College of Surgeons, Lincoln's Inn Fields.

Members of the Congress were received by the President, Sir John Bland-Sutton, and Lady Bland-Sutton, and by Mr. and Mrs. H. J. Waring. A number of Hunterian relics were exhibited.

FRIDAY, JULY 20TH.

Serotherapy and Vaccinotherapy in Surgery.

Dr. Louis Bazy's (Paris) paper was read by Dr. Michel, who said that doubtless the knowledge of the paraspecific effects of serums and vaccine (Widal's colloidoclasic shock, effect of Nolf's peptone) had its use, but in the present state of our knowledge we could not make full uses of the resources of serotherapy and vaccinotherapy if we did not recognise the idea of specificity. Apart from such, especially antitoxic sera (such as antitetanic serum, antigangrene serum, the efficacy of which had been amply proved), most of those used in surgery were less certain in their effect. He therefore thought it advisable to direct attention to local applications of serotherapy. This might prove of the greatest use to surgeons. It was also necessary to insist on the fact that repeated injections of serum became less and less effective, and therefore they should only be used in cases of extreme need, and then only as a last resort. The object of the use of vaccines was to produce artificially in the organism a state similar to the one in which it would be if it had recovered from an ordinary attack of the disease in question (Bordet). This definition showed that in surgery vaccination was of no practical value, as surgical infections when healed do not confer immunity. Recourse is mostly made to vaccinotherapy. This consisted in treating the disease during its development by injection of the specific germ more or less modified. Again, use might be made of bacteriotherapy. Here microbic products were used which had no connexion with the disease that was being treated. Another method was to try a "mixed immunisation," employing sera and vaccines—this might be called serovaccination. Generally speaking, sera should be used to produce a quick, but not a lasting, effect in cases of urgency. But vaccines gave only slow results, which were, however, more lasting. Serotherapy and vaccinotherapy were most valuable to the surgeons; they facilitated surgical treatment and localised it, but neither sera nor vaccines were of any use in necrosis or cicatricial lesions. Attention should be paid to signs of susceptibility to microbes on the part of "germ bearers," for most cases of "operative shock" are due to the sudden development of a germ, whose virulence had increased under conditions which had become less able to combat it. The skilful use of serotherapy and vaccines would enable us to anticipate and to counteract this susceptibility.

DISCUSSION.

Mr. D. P. D. Wilkie (Edinburgh), recognising that the mortality from operations on the large intestine arose chiefly from sepsis, either as wound suppuration, peritonitis, or thrombosis of large veins (the causal organism being the streptococcus or the *Bacillus coli*), had performed some animal experiments with a view to discovering whether it would not be possible to acquire some degree of immunity to those organisms. Both vaccines and the injection of nucleic acid were found to increase the resisting powers of animals, and a combination of both so raised the resistance that the animal could withstand the injection of 3 M.L.D. of the organism into the peritoneum. He had therefore introduced this practice into his routine preparation for such operations as colectomy or the closure of a fæcal fistula. Ten days before operation a dose of 10,000,000 streptococcal vaccine was given, and this was repeated three days before operation; on the night before operation a dose of 2 per cent. nucleic acid was given which resulted in a leucocytosis of 12,000. Sixty-three operations had been performed after this type of preparation with two deaths, neither of them from sepsis.

Dr. de Zawadski (Warsaw) had found vaccinotherapy very useful in cases of serious cervical suppuration, peritonitis, and empyema. It would not save all cases, but was a great help to rapid recovery.

Sir Almroth Wright (London) suggested increasing the resistance of the body before certain operations, such as extraction of teeth and tonsillectomy, and the removal of cancers; the latter were often infected by the staphylococcus and the streptococcus before coming to the surface. The failure of antiseptics in war surgery could have been foretold from laboratory experiments, since antiseptics when mixed with blood formed a better culture medium than blood alone. As regards vaccinotherapy, it was now apparent that not all bacterial infections could be successfully treated by vaccines (Pasteur's original view), for the combating of infection was carried on by two separate mechanisms: (1) by antibacterial substances in the blood, and (2) by phagocytosis by the leucocytes. In certain very acute infections the leucocytes were poisoned and unable to carry on phagocytosis, even in the presence of large quantities of antibacterial substances in the blood. The fact that so many different varieties of vaccines (complete and partial antigens, sensitised, detoxicated and defatted vaccines) had been employed showed that there was something wrong in the application of vaccine therapy. What was wrong was the dosage, which ought to be controlled by the response made by the body fluids. This was easily tested "in vitro," and if it was found that the addition of vaccine to the patient's blood resulted in a decrease of phagocytosis, it was certain that the administration of the vaccine would be harmful. In such cases, and in severe infections where no phagocytosis was occurring although the opsonic power of the serum was raised above normal, what was required was a number of healthy leucocytes. This call could be met by immuno-transfusion—i.e., the transfusion of 500 c.cm. of defibrinated blood from a donor previously immunised by a vaccine. It was important that the blood should be defibrinated and not citrated, as citrates adversely affected the leucocytes. He considered that passive immunisation with horse or other alien serum was useless.

Dr. Leclercq (Morristown, New Jersey), Dr. Zahradnicky (Prague), and Dr. Mayer (Brussels) also spoke.

Operative Shock.

Dr. George W. Crile (Cleveland, U.S.A.) read a paper on an Electrochemical Interpretation of Shock and Exhaustion. He elaborated a theory that man and animals are electrochemical mechanisms constructed on the pattern of the constituent cells, each of which in itself was an electrochemical mechanism. The difference in potential in the cells was maintained by oxidation. The brain had the highest rate of oxidation and the liver the lowest, hence he suggested the hypothesis that the positive pole was the brain and the negative the liver; the connecting wires were the nerves, and the salts in solution the electrolytic fluid in which the electrochemical mechanism was immersed. This hypothesis would interpret the fact that when the liver or the brain was removed the organism perished; if the animal were deprived of oxygen, the difference of potential within the cells would be lost and death would result. It would explain the essential rôle of water in living processes—i.e., as a non-conductor and a solvent attaining ionisation. Chemical action and electric conductivity were controlled by heat and cold; abdominal surgery in the colder months in unwarmed front area huts illustrated the fact that there was probably a lethal cold and a lethal warm temperature for this electrochemical mechanism. The electrochemical theory would interpret the specific antithetic action of adrenalin upon the temperature of the brain and of the liver and other organs in the splanchnic area. It would interpret the increase in electric conductivity of the brain by iodine, iodoform, and thyroid extract (hyperthyroidism); and the decreased conductivity of the brain after thyroidectomy. It would interpret the interference with digestion by the strong emotions, by injury, by pain, by infections, &c., for the splanchnic

processes were inhibited while the brain was stimulated. It would interpret the antithetic effects of fear and faith, and the failure of the health in man and animals under the stress of chronic fear or anger or other strong emotions. This theory would interpret the essential function of sleep as the period during which the difference in potential in the batteries which drive the organism, which had been decreased by the activities of the day, was restored. It would interpret the fact that in surgical operations, if a state of negativity and the internal respiration were maintained, there would be no surgical shock. The state of negativity was maintained by: (*a*) Exclusion of fear by management, by operation in the patient's room, by morphine, by analgesia; (*b*) exclusion of traumatic stimuli by local or regional anæsthesia, by gentle handling, by protection of the wounds from the irritation of air; (*c*) exclusion of stimulation by stimulant drugs. The entire process whereby the state of negativity was secured and the internal respiration—difference in potential—was maintained was included in the combination of methods of pre- and post-operative management and of surgical technique which was called *anociation*. The internal respiration was maintained by fluids, by warmth, by blood transfusion, by rest, by sleep, and by the avoidance of deep inhalation anæsthesia. Finally, and included in the above, the theory that man is an electrochemical mechanism interpreted many of the phenomena of life.

Traumatic Shock from a Clinical Point of View.

Dr. P. Mocquot read a paper which was the combined work of himself and his colleagues, Drs. M. Quénu and P. Duval. They showed the evolution of ideas concerning shock, and pointed out what the Medical Research Council and the Société Nationale de Chirurgie de France had done. They then turned to the clinical side of the subject, and laid stress on the early appearance of the peculiar symptoms of traumatic shock, and gave a list, based mostly on cases during the war, of the various signs, such as low temperature, low blood pressure, blood and urine analysis, &c. In addition to the recognised type they described a type of mitigated shock, often met with in ordinary surgery, caused by attrition of the tissues. It outlined a new chapter of surgical pathology. The prognosis of traumatic shock might be estimated by the temperature, blood pressure, and by the analysis of the blood and urine. The recovery of kidney function, the excretion of urea, and the diminution of the urea-content of the blood were the most favourable signs. Therapeutic treatment included prophylactic measures and the treatment of the shock when it occurred. Prompt medical and surgical treatment were a sine qua non of prophylactic care. The best surgical treatment consisted in the excision of the wound; immunisation by means of an anti-shock serum had not yet proved its efficiency, at least from a clinical point of view. The treatment of an ascertained case of shock might be symptomatic. The former was especially useful as a means of first aid. Causal treatment was grounded on the new view of shock as an intoxication, the seat of which was the traumatic lesion. Theoretically, the wound which gave rise to the toxins should be excised. Practically we were confronted with two separate questions as to whether the affected limb should or should not be amputated. In the former case recourse should be had to "primary" amputation. In the latter case the treatment should consist of thorough excision of the wound, and the devitalised parts should be cut out as widely as possible. The operation should be quick. The wound was sprinkled with hypertonic solution and no attempt should be made at first to bring the edges of the wound together. Further research was yet required to decide on the most suitable anæsthetic.

Mr. John Fraser (Edinburgh) pointed out that surgical shock arose from various causes, such as injury to a sensitive part like the hand, from the early symptoms of peritonitis, burns in a child, and extensive crushing injuries of the limbs. Whatever its origin, the essential feature of shock remained constant—namely, diminution of the volume of blood from its passage into the vast capillary system where it was not under the control of the bulbar vasomotor centre. The extent of this capillary system would be realised from the fact that if placed in line the capillaries of the human body would extend two and a half times around the world. There was growing evidence that these capillaries had an independent muscle system, and recently in observations on the swim-bladder of the eel he had seen dilatation of the capillaries occur from the shock of cutting.

Dr. Pauchet (Paris) held that all the symptoms of shock disappeared rapidly after oxygenated blood transfusion by Bécart's method. Operation shock should be avoided by a preliminary blood transfusion, repeated if necessary during the progress of the operation; transfusion should not be left until it was obviously useless. The effects of oxygenated blood transfusion were a lasting rise of blood pressure and improvement in the patient's condition from the supply of oxygen to the central nervous and endocrine systems: further acidosis was neutralised.

Dr. Ufreduzzi (Turin) said that in states of traumatic shock he used local or splanchnic anæsthesia for operations. He found it difficult to believe that the substance or toxin which produced shock came from injured muscle, since operation confined to muscle was not attended with shock.

Dr. Jiraseck (Prague) and Dr. de Zawadski also spoke.

Dr. W. W. Keen (Philadelphia) proposed a vote of thanks to the President and officers, naming especially Dr. Mayer, the secretary-general, and Sir D'Arcy Power and Mr. J. E. H. Roberts, the British organising secretaries, to whose work the success of the Congress was largely due. This was carried with acclamation, and Sir William Macewen replied.

It was announced that the next Congress of the Society would be held at Rome in 1926 under the presidency of Dr. Giordano (Venice), when the subjects for discussion would be (1) the Surgery of the Spleen, (2) Cerebral Tumours, (3) Radio-therapy in Uterine Cancer, and two other subjects to be chosen later by the scientific committee consisting of Mr. Percy Sargent (U.K.), Dr. Gosset (France), Dr. Alessandri (Italy), Dr. Henschen (Switzerland), and Dr. Ribas y Ribas (Spain).

The annual banquet was held on Friday, July 20th, at the Trocadero Restaurant, with Sir William Macewen, F.R.S., in the chair. The large company included the Presidents of the Royal Colleges of Physicians and Surgeons and of the leading London medical societies. Sir William Macewen toasted the foreign delegates, and Messrs. Alessandri, Mayer, Haussen, Petridis, Koch, Nicolaysen, de Lawadski, Kayser, de Quervain, and Crile, representing Italy, Belgium and France, Denmark, Egypt, Holland, Norway, Poland, Sweden, Switzerland, and the United States of America respectively, replied. The speeches dwelt almost entirely with the feelings of gratitude felt by the delegates for the hospitality which had been shown them in London, for the interesting work which they had inspected in the hospitals, and the excellent papers to which they had listened at the Conference. The next Conference in Rome was frequently mentioned and most hopeful anticipations were expressed that a large number of their London colleagues would be present to meet the foreign delegates.

INDEX TO "THE LANCET," VOL. I., 1923.

THE Index and Title-page to Vol. I., 1923, which was completed with the issue of June 30th, is now ready. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2.

ROYAL SOCIETY OF MEDICINE.—The William Gibson Research Scholarship has been awarded to Miss M. Forrester-Brown, of Dundee.

THE LANCET.

LONDON: SATURDAY, JULY 28, 1923.

THE ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION.

THE annual meeting of the British Medical Association, which is drawing to a close at Portsmouth, was held in an expansive mood. Its membership has reached the high-water mark of 1912 and there is no reason to anticipate the ebb which then followed, for dissension within the ranks over the broad principles of insurance practice is practically at an end, and the panel executive is looking forward with confidence to an amicable settlement of the outstanding question of the cash value of medical benefit to the community. The chairman of the body which has been conducting the matter received from the meeting a gratifying endorsement of past policy and a free hand for the immediate future. The financial situation of the Association is indicated by the fact that the treasurer did not blench at the proposal to disburse £100,000 or so in the purchase and adaptation of a new home which has been acquired in the neighbourhood of Tavistock-square, or even at the additional outlay of £50,000 which would provide for the social amenities long desired by members of the Association resident outside the metropolitan area. The building as it stands possesses artistic merit, affords sufficient scope for present activities, and contains a hall large enough for meetings of representatives. Situated within a stone's-throw of what is presumably the new site of London University, the officers of the Association foresee the possibility of making the house a nucleus of organised post-graduate teaching in London. A substantial sum is already set apart by the treasurer for the granting of research scholarships, and the chairman of the Science Committee desires to increase this sum. A third source of quiet satisfaction lay in the continuing success of the Journal of the Association, under the editorship of Sir DAWSON WILLIAMS, to whom warm congratulation was tendered on the completion of 25 years in the editorial chair.

The new President of the Association, Mr. C. P. CHILDE, chose for his inaugural address on Tuesday the subject of "Environment and Health." An abstract of his address appears at the front of our present issue. Speaking as the chairman of the Portsmouth Health and Housing Committee, Mr. CHILDE dwelt on the need for concentration on the prevention of disease, and on strengthening resistance to disease by the improvement of environment, rather than on the search for cures or palliatives when the damage is already done; and on care for the environment of the wage-earning classes as the greatest of all the problems of preventive medicine. Coming from one who is also senior surgeon to the Royal Portsmouth Hospital, these remarks will have carried the greater weight; they illustrate well the "whole-hearted joining of hands for a common purpose" described in his address as the best evidence of a loyal and healthy citizenship. We shall hardly be wrong in thinking that Mr. CHILDE had also in mind with no little satisfaction the signs of reconciliation between preventive and remedial methods within the borders of the Association. The rift ever growing wider between the aims of the Society of Medical Officers of Health and the British Medical Association has now been bridged by the mutual acceptance of a scheme for coöperation which permits of a common declaration of policy on general lines and which precludes the Society from taking independent medico-political action. This decision, ratified by the Representative Meeting at its first session, is the result of negotiations which have been in train since the annual gathering at Cambridge three years ago, and goes far deeper than the mere agreement on rates of salary and tenure of office, important as these are. The conference which drew up the scheme recognised that "benefit would be likely to result from a closer coöperation of the local medical profession with the local authorities' schemes of medical survey or inspection and treatment," and one of the first fruits of this recognition is the working agreement, which we chronicled last week, between practitioners and civic council in the urban district of Willesden, where the two policies had been allowed to grow apart until reconciliation became difficult and tedious. In Portsmouth there has been no such divergence, although the sanitary authority is keen. In many other places similar divergence must have arisen if the advocates of both policies had been as keen as they were at Willesden. Within the British Medical Association itself there will now be the reconciling influence. A great opportunity has not been lost.

CANCER FACTS AND CANCER THEORIES.

FOR hundreds of years cancer has occupied the attention of physicians and surgeons, and it would be impossible to estimate the expenditure of time and energy on this absorbing subject since the doctrine of cellular pathology was first developed. It would be too much to hope that this labour has always been wisely directed or accurately performed. Much of it has resulted in knowledge which is permanent, but much more has clogged the literature with doubtful if not inaccurate statements, so that year by year the subject becomes more obscure, and the modern investigator finds his task not always lightened by the work of his predecessors, and rendered sometimes more difficult. Numberless examples of this could be quoted, but two will suffice. What are the actual results of operation in, say, cancer of the breast? What is the proportion of absolute cures, and how do the modern operations compare with the old, either as palliative or curative measures? Accurate answers to these questions are difficult to obtain, and, furthermore, there is a tendency for the written word to be forgotten though the personal impression

survives; and the natural optimism of the human race connives only too readily in the conversion of the possible into the probable. Again, on the academic side, is the endothelial cell as prone to neoplastic transformation as the literature of recent years would lead one to suppose? It is, of course, a matter of some importance in view of the possibility that cancer may be due to some circulating substance, virus, hormone, or what not; but who shall say when histologists disagree? The situation is not improved by that sinister influence, often exercised by teratology on its votaries, which demands the elaboration of theories. It is impossible to contemplate with equanimity the sum of human endeavour which has been squandered in supporting or disproving unworthy theories.

Modern experimental methods are throwing on the cancer problem a light which bids fair to be powerful enough to illuminate its darkest corners, and one cannot read the article by the Director of the Imperial Cancer Research Fund, which appears in this issue, without experiencing a thrill of expectation. The elaboration of a technique by which cancer can be produced practically at will, combined with other methods of biological research, such as tissue culture, must undoubtedly and in the near future lead to most important results. Already theories which for generations have dominated certain schools of pathology are in process of demolition. The vague conception of "tissue tension" by which the disappearance of a hypothetical physiological influence of one tissue or another was held to explain the origin of malignant growth is untenable in view of the modern conception that the cancer cell differs from its progenitor in the acquirement of an actual positive property, that of continuous proliferation, though the stimulus to this may be no longer active. And the behaviour of the malignant and innocent cells during propagation outside the body shows conclusively that anaplasia as described by v. HAUSEMANN does not really exist. There is no true assumption of embryonic character by the malignant cell, and no specific loss of differentiation. At the same time the actual facts of human and experimental pathology which have hitherto been inexplicable are rapidly becoming clarified. Isolated observations which have meant little or nothing in themselves are being dovetailed one into the other, and our conceptions of what constitutes the malignant process are becoming firmer and more clearly cut every day.

The most significant aspect of the new work, however, is that which indicates the presence of a profound systemic or constitutional change in the individual in whom a malignant growth has developed. That such a change occurs is shown by the failure of animals in which a malignant growth has spontaneously occurred, or has been produced experimentally, to react in the usual way to fresh applications of tar. There seems to be quite definitely a high degree of resistance to the development of a second tumour, and though the experimental observations are few they fall into line with the facts of human pathology. It is common knowledge, for example, that multiple or even double primary malignant tumours in the same individual are rare. Unless we conceive the possibility of the simultaneous action in different parts of the body of different cancrogenic influences, the development of one tumour must be inimical to the growth of another. What constitutes this resistant state is as yet quite obscure—its presence can be recognised experimentally, but there is nothing to indicate in what it consists. Nevertheless, we are justified in believing that the next few years will see the question answered, with results in the diagnosis and treatment of malignant disease which could not even have been foreshadowed a very few years ago.

CHILD MORTALITY IN SCOTLAND.

THE rates of infant and child mortality in Scotland for a series of years up to and including 1922 are given in the fourth annual report of the Scottish Board of Health, recently issued and summarised on another page of our present issue. We note that in the three years 1919–21 the rate of infant mortality averaged 94 per 1000 births in Scotland, as compared with 84 in England and Wales. The only partial participation of Scotland in the degree of reduction of infant mortality secured in England is obviously a subject deserving of careful study. In both countries the rule holds good: that a high rate of infant mortality is associated in the same community with a high death-rate in children over 1 and under 5 years of age. Thus in the experience of Scotland as a whole, in 1915 an infant death-rate of 126·5 was associated with a death-rate at ages 1–5 of 22·5, while in 1921 an infant death-rate of 90·3 was associated with a death-rate at ages 1–5 of 12·4. A valuable table given in an appendix to the report shows the variations in, and by implication, the degree of preventability of infant mortality in different parts of infancy. Thus, at ages 6–12 months infant mortality per 1000 births varied from 4·1 in Perth to 26·5 in West Lothian, and from 32·1 in Hamilton to 14·4 in Dunfermline. Similarly at ages 3–6 months there were variations between 8·2 in Sterling and 23·8 in Kincardine, and between 9·7 in Clydebank and 27·0 in Aberdeen. At ages 1 to 3 months in towns with a population of over 20,000 infant death-rates varied from 6·3 (Hamilton) to 22·3 (Aberdeen), and at ages between one week and under a month from 26·4 in Perth to 6·9 in Kirkcaldy. At ages under one week the highest death-rate was 36·1 in Kilmarnock, and the lowest, 19·8, in Port Glasgow. It may be surmised that owing to inaccuracies of registration of age at death there may have been some transfer between deaths under one week and deaths in the next three weeks of extra-uterine life; but allowing for this, the variations in local incidence of infant mortality in successive parts of infancy are very striking, and show the need for further investigation. The figures point unmistakably to the preventability of a large part of the current infant mortality in the earlier months after birth.

Annotations.

"Ne quid nimis."

THE MUSEUM OF THE COLLEGE OF SURGEONS.

THE most noteworthy event recorded by Sir Arthur Keith, conservator of the museum of the Royal College of Surgeons of England, in his recent annual report is the completion of the series of specimens which illustrates the principles of pathology—the great series which is now exhibited on special stands on the floor of Room III in the museum. In 1910 Prof. S. G. Shattock and Mr. Cecil Beadles began to select, arrange, and catalogue specimens for this purpose, and now, for the first time, a complete and systematic treatise on disease has been compiled, not in words, but in illustrative specimens. The work was broken into by the war, and subsequently by the high prices charged for museum materials, but in the spring of the present year the series of general pathology was completed. The scope of this section of the museum is now fixed; if changes are made in the future they will have to be done by replacement rather than by addition. The re-arrangement, re-mounting, and re-cataloguing of that department of the museum which illustrates disease of the various parts, organs, and systems of the human body is now being undertaken. During the year a special room was provided to house and exhibit the War Office collection of medical specimens—now known as the Army Medical Collection—which had been handed over to the custody of the College. During the last 12 months 370 specimens have been mounted and added to this collection and considerable progress has been made with its cataloguing. The series of teratology and of human osteology have received valuable additions during the year, and the mounting and arrangement of the material of the Onodi collection has made good progress. The preparation of a new catalogue of the human remains preserved in the museum, a task undertaken by Miss M. L. Tildesley, working under the Council of Scientific and Industrial Research, is still in progress. The completion of this work, which involves much labour and research into records, is regarded by the conservator as most important in view of the desirability of arranging the human remains at our disposal in a proper time sequence, in order to study structural changes in succeeding periods, and an appeal has been made to the Council of Scientific and Industrial Research to have Miss Tildesley's appointment renewed for at least another year. Reports on various human remains submitted to the College for examination have been made during the year and facilities have been afforded and material supplied to investigators in various fields. In a brief report from the curator of the physiological department of the museum, special attention is drawn to a series of eel larvæ presented by Dr. Johannes Schmidt in illustration of his important researches on the peculiar and till recently unknown breeding habits of this fish, among other recently acquired specimens. Mr. Alban Doran has almost completed the descriptive catalogue of the collection of surgical instruments in the possession of the College, a task to which he has given 12 years of his life. He is now engaged on the last section of the collection—the surgical instruments used by barbarous and semi-civilised peoples. 11,688 students and visitors used the museum during the past year. Specimens recently added to the museum will be on view in Room I from Oct. 8th until Nov. 5th next.

NEW DIRECTOR-GENERAL OF THE NAVAL MEDICAL SERVICE.

IT has been officially announced that Surgeon Rear-Admiral Joseph Chambers will succeed Surgeon Vice-Admiral Sir Robert Hill as Director-General of the Medical Department of the Royal Navy on Oct. 1st. Sir Robert Hill, whose retirement will be received with regret, before his appointment some four years ago was Principal Medical Officer in the Grand Fleet, serving under both Lord Jellicoe and Lord Beatty. His excellent organisation at the Battle of Jutland received special commendation, and was recognised by his promotion to the rank of Deputy Surgeon-General. He was many times selected as medical officer on the ships which have carried the King and Queen when Prince and Princess of Wales on tours to India and the colonies.

Surgeon Rear-Admiral Joseph Chambers, who has had much administrative experience at Haslar, was appointed in 1908 health lecturer at the home ports, and later took over the charge of the Naval Hospital at the Cape of Good Hope. In 1913 he was appointed medical officer of the cruiser *Suffolk*, the original flagship during the war of the late Admiral Cradock, and in 1915 was transferred to Chatham Hospital. Since October last he has been in charge of Plymouth Hospital. We congratulate him on the high charge to which he has now been appointed.

OUTBREAKS OF SEPTIC SORE-THROAT SPREAD BY MILK.

OUTBREAKS of sore-throat, usually accompanied by other complications, spread by contaminated milk and due to streptococci, although not very common are yet sufficiently numerous to warrant careful consideration. Nearly all the earlier outbreaks were reported in this country, and Savage,[1] in 1912, gave particulars of 18 outbreaks in Great Britain. Since that date few further outbreaks have been reported here, but a considerable number has occurred in the U.S.A., many of which have been very extensive and have been studied in considerable detail. Notable American outbreaks are those in Boston, Chicago, and Baltimore. The pioneer scientific work upon the relationship between mastitis in the cow and human disease was done by Savage between 1906 and 1909, and is contained in three reports made to and published by the Local Government Board.[2 3 4] His views as to the relationship were summarised in a paper read before the Epidemiological Section of the Royal Society of Medicine, in February, 1911.[5] While in common with earlier continental workers he found that the ætiological factor in most cases of bovine mastitis was invasion by streptococci, he carried the subject further and differentiated between the types present. It is a striking fact that while on the one hand bovine mastitis is a widely prevalent condition and the importance of excluding from the milk-supply all the milk of infected animals is not well realised or acted upon, on the other hand, outbreaks of septic sore-throat from milk are rare. Savage was able to demonstrate that the ordinary type of streptococcus (*Streptococcus mastitidis*) associated with bovine mastitis is non-pathogenic to mice and other rodents, readily sets up mastitis in experimental goats, but fails to set up disease when inoculated upon the human throat. In contra-distinction the streptococci associated with human sore-throat possess a considerable pathogenicity for mice and guinea-pigs, but do not readily set up mastitis in goats. In one case, however, a streptococcus was isolated from a case of bovine mastitis which was of the human type. From his extended investigations Savage advanced the hypothesis which may be stated in his own words (1911): "Briefly stated, I regard the bovine udder and teat lesions, as commonly met with, as of purely bovine origin and, as such, harmless to man. Occasionally, either as an invasion superadded upon the original bovine lesions or as a primary infection of the milk-organs, there is a local infection with organisms of

[1] W. G. Savage: Milk and the Public Health, 1912.
[2] Report of the Medical Officer, L.G.B., 1906–07, pp. 205–252.
[3] Ibid., 1907–08, pp. 359–424. [4] Ibid., 1908–09, pp. 294–315.
[5] Proc. Royal Soc. of Med., Epidemiological Section, 1911, iv., 73.

human origin. In such cases the conditions present may be decidedly prejudicial to man. In other words, the cow, in this class of infections, is only potentially pathogenic to man when it acts as an active or passive carrier of organisms of *human* origin."

Since that date these conclusions have been very completely confirmed by extensive work in America, but conducted upon rather different lines. This work has mainly been in the direction of further differentiation of the types of streptococci found, particular attention being paid to their hæmolytic properties. For example, Theobald Smith and J. H. Brown [6] studied the streptococci isolated from certain milk-borne epidemics of tonsillitis in Massachusetts, in 1913 and 1914, and drew attention to the hæmolytic character of the strains responsible for the outbreaks, while they found the ordinary bovine streptococci to be non-hæmolytic. Their hæmolytic properties (β-type) are also different from those of the common throat streptococci (α-type). Other investigators, e.g., Davis,[7] have shown that hæmolytic streptococci may be found in many different types of milk and that these may differ from human hæmolytic streptococci in their being non-virulent to rabbits. The mere fact that they are hæmolytic does not establish their human origin. That hæmolytic streptococci of human origin may set up bovine mastitis in cows was shown by Davis and Capps [8] by direct experiment, the mastitis lasting for several weeks in the experimental cows, this time roughly corresponding to the duration of milk-borne epidemics. Jones [9 10 11] showed that both hæmolytic and non-hæmolytic types of streptococci may set up bovine mastitis, the human type producing the more severe inflammation. He also showed that a milker may readily carry streptococci on his hands from an infected to an uninfected cow. These and other investigations show that the differentiation of streptococci of human and bovine type, like all streptococcus classifications, is complicated and difficult and is not merely a question of hæmolytic ability. Other tests have been advanced, both by Savage and by the American workers. Avery and Cullen [12] have shown the advantage of determinations of hydrogen-ion concentration in glucose-broth cultures. Cultural sugar tests are also of importance. With present knowledge it would appear that, while no one test is conclusive, by employing a large series of differentiating characters it is possible to give an opinion with considerable certainty as to the type (human or bovine) of streptococcus present in a milk-spread outbreak. Brown and Orcutt [13] have found it possible in an outbreak in Boston in 1917 to identify the particular infective strain from the mastitis fluid with that from the sore throats of the sufferers.

The most recently recorded outbreak of septic sore-throat spread by milk is in Portland, Oregon, and is described by Benson and Sears.[14] The outbreak, which took place in March, 1922, was extensive, comprising 487 cases with 22 deaths. Almost all the cases drank milk from one particular dairy, which supplied non-pasteurised milk. The dairy supplied about 1200 persons, so a considerable number escaped infection. The mortality-rate was 4·3 per cent. It was ascertained that cows with diseased udders were kept in their regular stalls along with the healthy animals and in some instances only the milk from the diseased quarter was excluded from the milking. From one cow suffering from mastitis the authors isolated a streptococcus which they considered from its characters to be a human strain and which, as regards its virulence to rabbits and white mice, was of that type. It was identical with streptococci cultivated from the patients. Hæmolytic streptococci were isolated from only one of the milkers. This man had large red tonsils and gave a history of a mild sore-throat. They consider that this milker was responsible for the infection of the diseased cow's udder, that she developed a mastitis of human streptococcic origin in one quarter and that the milk of this cow was at some time included by mistake in the whole milk of the herd. The weak link in the argument is that the date of the examination of the milker is not given and no evidence is advanced to show that the milker might not have been a sufferer from consuming infected milk rather than the indirect cause of the outbreak.

[6] Jour. of Med. Research, 1915, xxxi., 455.
[7] Jour. of Inf. Dis., 1916, xix., 236.
[8] Ibid., 1914, xv., 135.
[9] Jour. of Exp. Med., 1918, xxviii., 149.
[10] Ibid., xxviii., 253.
[11] Ibid., xxviii., 735.
[12] Ibid., 1919, xxix., 215.
[13] Ibid., 1920, xxxi., 49.
[14] Jour. of Amer. Med. Assoc., 1923, June 2nd, 1608.

THE CENTENARY OF THE EDINBURGH VETERINARY COLLEGE.

THE dawn of veterinary science in the north of Great Britain was due almost entirely to the dogged and persistent efforts of William Dick. For nearly 40 years he laboured in the teaching and demonstrating of animal diseases and ailments, and starting with a small class in Clyde-street he saw his efforts, after many struggles and vicissitudes, crowned with success in the establishment of the Dick Veterinary College. An interesting and well-written history of this Veterinary College, by Dr. O. Charnock Bradley, its principal, has just been published.[1] Since Dick's death the College has had several stalwarts associated with its activities and teaching. T. Strangeways, W. Williams, T. Walley, J. R. U. Dewar, and the great financial helper, Alexander Inglis Maccallum, have all been fine characters and men of mark. Many successful practitioners scattered over the United Kingdom and the colonies have emanated from the College and now the successor of the Clyde-street building at Summerhall will compare favourably with any veterinary college or school in the world. The book has some excellent photographs of the men who laid the foundations of veterinary science. A centenary fund is about to be inaugurated to found a post-graduate fellowship in veterinary science and the proceeds of the sale of this book are to go to the fund.

[1] History of the Edinburgh Veterinary College. By O. Charnock Bradley. With illustrations. Edinburgh: Oliver and Boyd. 1923. Pp. 101. Parchment, 8*s.*; half linen, 5*s.* 6*d.*

AN EPIDEMIC OF ERYTHEMA NODOSUM.

THE view that erythema nodosum is nothing more than a rather obscure manifestation of tuberculosis finds no support in the fact that now and then this eruption occurs in epidemics unrelated to any possible source of tuberculous infection. Such an epidemic has been reported by Prof. E. Ledoux in the June number of *Revue de Médecine*. In a school of midwifery 20 probationers were accommodated in a dormitory, along the walls of which some of the beds were placed. Other beds were in the centre of the dormitory, and it was a very significant fact that all the probationers developing erythema nodosum were accommodated in the central beds, which were close together. The first patient, aged 22, had been subject to frequent attacks of slight tonsillitis. On Dec. 9th, 1921, she attended a confinement, during which she felt perfectly well. On the 10th she developed a sore-throat, and in the evening of the same day an attack of shivering was accompanied by a violent headache and a high temperature; for some days it ranged from 38·5° C. to 40° C. There was no cough, and the urine was normal. Typical erythema nodosum developed on the 13th, when it first appeared on the legs. A day later some nodes also appeared on the arms. The temperature returned to normal on Dec. 21st, but during Jan. 21st, 22nd, and 23rd, and again during Feb. 3rd, 4th, 5th, and 6th, there were attacks of what seemed to be rheumatic fever, a temperature of 40° C. being associated with painful swelling of the knees and ankles. The next patient, aged 22, suffered for two or three

days from slight headache and general malaise, but she was not at first ill enough to give up work. On Dec. 18th the headache became violent, and two days later there was an extensive eruption of erythema nodosum on the legs and arms. Three or four days later some nodes appeared on the face, and there was slight conjunctivitis on the left side. On Dec. 25th one knee became swollen and very painful. A blood culture proved negative. The third probationer fell ill on Jan. 1st, 1922, with headache and a temperature of 38·7° C. Next day erythema nodosum appeared on the legs, and on the 3rd there was an attack of epistaxis; the headache was now less severe. By the 11th she was convalescent, but on the 13th the temperature rose to 40·3° C., and the knees and ankles became swollen. The fourth probationer fell ill in the middle of January, when one erythematous node appeared on the left leg. She remained at work for four days, suffering only from slight lassitude. On the fifth day, however, the temperature rose to 39·5° C., and she complained of severe headache. An extensive outbreak of erythema nodosum now appeared on the limbs, and she was ill for 15 days with a high temperature. Convalescence was protracted and complicated by pain in the joints, lasting several weeks. Only the first patient suffered from a sore-throat at the beginning of the illness, but all four complained of severe headache and general malaise. In no case was there any family or personal history of tuberculosis, and there was no other evidence of tuberculosis.

STERILISATION OR SEGREGATION.

IN a recent pamphlet entitled "Sterilisation and Mental Deficiency" (2*d.*) the Central Association for Mental Welfare include a considered report by their standing medical committee on the question of the surgical sterilisation of mental defectives, referred to them by the council of the Association in June, 1922. The report does not discuss legal or ethical considerations, but only the medical and biological problems involved. The provisional conclusion arrived at is that the sterilisation of defectives is not under existing conditions a practical policy, though it may be applicable to individual cases.

To effect sterilisation in either sex the surgical operations in common use are the following: (1) Vasectomy in the male; (2) salpingectomy or ovariotomy in the female. The evidence shows that vasectomy is a very simple and safe operation, that it effectively prevents procreation, and that it does not interfere with the physiological equilibrium of the individual. The operations necessary in the female are of a more serious nature and involve all the risks pertaining to an abdominal operation, as much risk perhaps as a simple operation for appendicitis. Ovariotomy interferes with the physiological equilibrium. Either operation prevents propagation. Sterilisation is recommended by its advocates for two main purposes: (*a*) With the object of ameliorating or curing certain abnormal or perverted sexual tendencies and improving the mental condition and character of the individual; (*b*) with the object of eradicating or preventing the spread of mental defect. The first of these objects would not be attained by the comparatively simple operations mentioned, and the committee regard the evidence as to individual improvement from the more serious operations of removal of the testes and ovaries as inconclusive. With regard to the racial effect of sterilisation in preventing mental deficiency, they draw attention to the following points. Excluding cases of mental defect which are not germinal in origin, but which are a consequence of accident or disease acting directly on the individual and are not transmissible, the weight of the available evidence is to the effect that although the fact of the transmission of mental defect by mentally defective parents is undoubted, a proportion only of mental defectives are the offspring of obviously defective parents. The majority are either the children of parents who appear to be normal, although frequently "carriers," or of those suffering from insanity, psychoneuroses, or a mild degree of mental or physical abnormality which is not certifiable. It consequently follows that even were all certifiable defectives sterilised, mental defect would not be eradicated, and its prevention would only be effected to a partial extent. This fact would not in itself justify rejection of the proposal; for obviously partial prevention is better than none at all. There is, however, another aspect of the question. A large proportion of mental defectives, as a consequence of their defect, evince such marked anti-social propensities or social incapacity as to render institutional care necessary. This necessity would be in no wise lessened by their sterilisation, and since adequate segregation is at once an effective preventive of propagation and the best means of dealing with the social failings of the individual, it is regarded by the committee as a preferable procedure. Further, sterilisation of certifiable mental defectives might lead to a false sense of security and result in a large number of defectives who should be segregated being set at liberty. Sexual assaults, promiscuous sexual intercourse, and a direct increase in the incidence of venereal diseases and their sequelæ might be expected to ensue.

The committee add a note regarding the operation of sterilisation laws in the United States of America, where such laws have been enacted since 1907 in 15 States. In five of these the law has been declared to be unconstitutional; in one (New York) it has been definitely repealed; in four the law is practically a dead letter; in three it is still being used, but only to a very limited extent; and in two only (California and Nebraska) is it said to be made use of at all extensively. The largest number operated upon has been in California (2558 cases); these have been chiefly males, who were at the time inmates of State institutions, and no particulars are available regarding their subsequent career.

As an outcome of the report of this medical committee, the members of which include Dr. G. A. Auden, Dr. Helen Boyle, Dr. H. B. Brackenbury, Dr. Cyril Burt, Dr. R. H. Cole, Dr. W. H. Coupland, Lord Dawson, Colonel F. E. Fremantle, M.P., Dr. F. A. Gill, Dr. G. B. Griffiths, Sir Frederick Mott, Dr. C. S. Myers, Dr. W. A. Potts, Dr. F. C. Shrubsall, Dr. A. F. Tredgold, Dr. F. D. Turner, and Dr. Meredith Young among others, the Central Association for Mental Welfare has formed the following conclusions: (1) That segregation is the best method of dealing with certifiable defectives who cannot adapt themselves to the existing social code; and (2) that judicious and kindly supervision is the best method of dealing with those not possessed of marked anti-social propensities. It is considered that these are the foundations upon which a satisfactory national scheme for dealing with the problem of mental defect may be built up.

LINITIS PLASTICA.

Dr. Albert F. R. Andresen[1] of the Gastro-Enterological Department of the Long Island College Hospital, who reports two illustrative cases in women aged 38 and 57, in whom the diagnosis was confirmed by autopsy, remarks that the term linitis plastica was first used by Brinton in 1854 to describe a diffuse increase in the connective tissue of the stomach and characterised clinically by an insidious onset, slowly progressive cachexia, and fatal termination. The most exhaustive study of the disease since Brinton's time was made by H. M. Lyle in 1911, who collected 131 cases from the literature to which he added one of his own. Linitis plastica is a disease occurring in persons of the carcinoma age, nearly all the cases on record being between the ages of 40 and 60. Males are affected twice as often as females. Usually there is some previous history of ætiological significance, such as cardio-vascular disease, alcoholism, gastric ulcer, syphilis, tuberculosis, or occupational trauma. The symptoms are not characteristic but are merely

[1] American Journal of the Medical Sciences, June, 1923.

those of the achylia gastrica which is usually present, and consist in anorexia, nausea, upper abdominal discomfort or pain, vomiting, alternate constipation and diarrhœa, and more or less intense secondary anæmia. Hæmatemesis is rare. A feeling of fullness after ingestion of even small quantities of food is very suggestive, being a direct result of the actual diminution in size and loss of elasticity of the walls, as is also vomiting or regurgitation of any excess above a certain amount. Ascites may develop later. In advanced cases a sausage-like tumour may be felt lying transversely in the epigastrium. On inflating the stomach or injecting water into it through a tube the air or water may be felt gurgling rapidly through the tumour. Test-meal examination shows the rapid emptying of the stomach and the absence or reduction of hydrochloric acid. Fluoroscopic examination reveals a small hypermotile stomach, the barium mixture passing rapidly across the upper abdomen and filling the intestinal coils. The prognosis is not good, as even after removal of the gastric focus there may be progressive changes in the colon, rectum, and small intestine, causing stenosis. The average length of life in the benign cases is four years, and in the malignant two years. Treatment consists in gastrectomy, either primarily or in advanced cases, after a primary jejunostomy to improve the patient's nutrition sufficiently to make him fit for operation. In cases where the pylorus is sufficiently patent to admit the passage of a tube duodenal feeding is indicated before the operation.

"LEAVING IT TO NATURE."

WHEN there is a miscarriage of justice and an innocent person is in prison for many years, the community to which he belongs stands aghast in sympathetic horror. Medicine being a far more complicated matter than the law, it is, unfortunately, inevitable that serious medical errors—some only errors of omission—are often made, condemning the victim to years of invalidism and misery. Of late years there has been a healthy movement in this country as well as on the Continent to shun the omniscient pose and to reduce the incidence of future blunders by giving past blunders publicity—or as much publicity as the courage and conscientiousness of the blunderer permit. In *Le Scalpel* for June 16th Dr. de Harven, of Brussels, has recorded an instructive case which is probably not unique. The patient was a woman, aged 52, who had given birth to three infants, and whose last confinement 15 years earlier had been followed by severe puerperal fever. She was confined to bed by this illness for six weeks, and the vaginal discharge continued to be profuse and purulent; she suffered from general weakness and amenorrhœa. Exactly a year after her last confinement the purulent discharge suddenly ceased, the abdomen became painful, particularly in the left iliac fossa, and there was a rise of temperature. The practitioner who was consulted diagnosed a hernia; his offer to operate on it was rejected. At this stage the patient herself could feel a hard, painful swelling, of the size of an egg, above the pubes, a little to the left of the middle line. This swelling was evidently the uterus distended by pus, which, owing to obliteration of the cervical channel, could not escape as before through the vagina. The patient was very ill and emaciated at this stage, but she gradually became a little better, being able to drag herself about. She could not run or exert herself in any way; even slight movements provoked abdominal pain, and merely walking upstairs distressed her. For 14 years she dragged out this painful existence, the slowly growing tumour in the abdomen becoming more and more troublesome and painful. While she was convalescing from an attack of influenza, she suddenly experienced excruciating pain in the abdomen, and during the next few days there was incessant vomiting with fever and other alarming signs. After this state of affairs had lasted seven weeks and she was practically moribund, she was seen for the first time by Dr. de Harven, who found a swelling, as large as an adult's head, in the lower abdomen and in the middle line. It was dull on percussion and tender. The cervix was small and hard, and there was no discharge from it. On laparotomy the swelling was found to consist of the much distended uterus which was adherent to the anterior abdominal wall. The Fallopian tubes were normal, and the ovaries were small and hard. Detachment of the adhesions between the uterus and the abdominal wall set free a veritable flood of green, creamy pus, containing streptococci, and there proved to be more than a litre and a half in the uterus. Subtotal hysterectomy was performed, and though recovery was complicated by severe suppuration, she ultimately recovered, being restored to complete health—after 15 years of misery. Apparently the influenza had stirred the streptococci into renewed activity, and the agonising pain experienced some weeks before the operation was evidently due to perforation of the uterus. Fortunately the pus became localised by adhesions and did not spread throughout the abdominal cavity. The walls of the uterus were about five times as thick as normal and had undergone fibrotic changes. Within this dense fibrous capsule the lymphatics of the uterus had evidently been compressed, and thus the enormous bag of pus within the uterus had become effectively isolated, and the uterine appendages had remained practically normal. It is probable that the patient had acquired considerable immunity to the invading streptococci, for without such immunity she could hardly have survived the severe suppuration following the operation.

OPHTHALMOLOGICAL TRAINING FOR MEDICAL STUDENTS.

WE have received from the Council of British Ophthalmologists details of correspondence which passed between that Council and the Registrar of the General Medical Council in the first half of the present year. In March the Council of British Opthalmologists drew the attention of the General Medical Council to statements in the final report of the Departmental Committee on the "Causes and Prevention of Blindness," which had recently been published, to the effect that the "inadequate knowledge of diseases of the eye possessed by the large majority of the medical profession on admission to the Register" is largely due to the limited training in this subject which they receive as medical students, that few universities and examining bodies in Great Britain require candidates for a qualifying degree or diploma to be examined in ophthalmology, and that although questions on ophthalmic surgery are occasionally included in a paper, or in the oral examination, these cannot be considered as an adequate test of the candidate's knowledge of this subject. The Committee further stated that in their opinion no licence to practise medicine should be granted without satisfactory evidence of an adequate knowledge of diseases of the eye. The Council of British Ophthalmologists pointed out that this recommendation of the Departmental Committee coincided with their own previously expressed views, and encouraged them again to urge the General Medical Council to insist, by means of an examination in ophthalmology, on a uniform standard of knowledge in this subject. The General Medical Council's ruling of May, 1919, laid it down that every student should be required to attend a course of practical instruction in ophthalmology of not less than 10 weeks' duration, and that no student should be admitted to the final examination unless he produced a certificate testifying to such attendance and to a satisfactory standard of work. To this the Council of British Ophthalmologists objected on the ground that the arrangement left the evidence of satisfactory work entirely to the discretion of the ophthalmic surgeon in charge, and that in the London medical schools the evidence of satisfactory work was receiving very different interpretations. "In one school every student is now required to pass an examination before

his certificate is signed, in others mere attendance in an ophthalmic department is recognised as sufficient." This difference, they stated, engendered a feeling of injustice amongst students of different schools, and was unsatisfactory from the point of view of uniformity in the standard of requisite knowledge. The experience of the Irish universities and colleges showed that there was no great difficulty in conducting an examination in ophthalmology as an intrinsic part of the final examination for degree or diploma. After the recent Summer Session of the General Medical Council, the Registrar informed the Council of British Ophthalmologists that their letter had been considered by the Examination Committee of the Council, and that the greater part of the communication was printed in full in the report made by that Committee to the Council on June 1st.

Among the recommendations of the Committee adopted by the Council were the following :—

That the Ministry of Health be informed that on May 25th, 1922, the Council made certain recommendations to the Licensing Bodies for the improvement of the medical curriculum, one of which was that each student should receive instruction, inter alia, in the diseases of the eye, refraction, and the use of the ophthalmoscope. The Council thereby anticipated the wishes of the Departmental Committee as set forth in their report, which was not published until the autumn of that year.

That the Council of British Ophthalmologists be informed that it is too soon to judge of the effect of the resolution recently adopted by the Council.

It was stated in evidence before the Departmental Committee that some of the worst results of ophthalmia neonatorum occur in cases which have from the beginning been under the sole charge of a medical practitioner. It may be left to the General Medical Council, acting with the vigilant assistance of the Council of British Ophthalmologists, to terminate the condition of affairs which allows such a statement to be made.

ELEVENTH INTERNATIONAL PHYSIOLOGICAL CONGRESS, 1923.

Sir Edward Sharpey Schafer, presiding at the Eleventh International Physiological Congress, held at Edinburgh this week, noted that the several speeches of welcome, addressed to the delegates by Captain Elliot on behalf of the Government, by the Lord Provost on behalf of the City, and by the Principal on behalf of the University had become progressively more intimate, beginning with the country at large, passing to the city of Edinburgh, and ending with the University. It was his duty and pleasure, he said, to tender the most intimate welcome of all, that of British physiology. They had before them a counterfeit presentment of the greatest of all British physiologists—William Harvey—and the President asked their acceptance, as a memento of the occasion, of a medal which had been designed from this bust by Mr. Pilkington Jackson, who had also modelled the bust from Harvey's authentic portraits. The President desired especially to associate the name of Lister with the gathering in Edinburgh, partly because he was for several years professor of surgery in the University, but chiefly on account of the fact that the researches which preceded his great discovery were researches in pure physiology and were inspired by that great teacher William Sharpey, who migrated in 1836 from Edinburgh to London and to whom the speaker and many other British physiologists owed, directly or indirectly, their introduction to the science. Incidentally it was of interest that both Harvey and Sharpey were born in the same town, Folkestone, although at an interval of more than 200 years. The President then welcomed the members of the Congress on behalf of the countrymen of Harvey and Sharpey and Lister, and noted with regret the loss of 22 workers in physiology or allied subjects who had died since the last Congress was held, among them being F. A. Bainbridge, Wilhelm Hofmeister, François Franck, and Augustus Waller. It was fortunate, he said, that the president of a physiological congress was not expected to give an account of the progress of the science since the preceding meeting. The task would, indeed, be a difficult one in view of the complexity of the science and the small part of it any one person could be expected to master. There was, however, a particular subject which was arousing an extraordinary amount of interest, not only amongst physiologists and physicians, but amongst the general public. The subject concerned the internal secretion of the pancreas and was especially connected with the activities of the Toronto School. On this account the Committee of the Congress had invited Dr. J. J. R. Macleod, the distinguished professor of physiology in the University of Toronto, to lecture to the Congress on Insulin. The President then invited Prof. Macleod to read his address, of which an abridged version will be found on p. 198 of our present issue.

THE ADMINISTRATION OF THE VACCINATION ACTS.

THE present epidemic of small-pox in parts of the country emphasises the importance of securing the proper administration of the Vaccination Acts, and the necessity of ensuring that exemption from vaccination is only obtained in conformity with the law. The Minister of Health has issued to boards of guardians a statement of the legal provisions in this connexion ; cases have been brought to his notice in which statutory declarations of conscientious objection to vaccination have been accepted by vaccination officers, although they have been made by some person other than the legal guardian of the child, and various other irregularities have occurred which, he is advised, render the statutory declaration of no effect. In some districts the prosecution of defaulters has entirely ceased. The statement points out the following facts : —

In ordinary circumstances the father is the person having the custody of a legitimate child, and the obligation therefore rests upon him unless, by reason of his death, illness, absence or inability, or for any other cause, the mother or some other person has the custody of the child. The Vaccination Act of 1907 provides that no parent or other person shall be liable to any penalty under Section 29 or Section 31 of the Vaccination Act of 1867 if within four months of the birth of the child he makes a statutory declaration that he conscientiously believes that vaccination would be prejudicial to the health of the child, and within seven days thereafter delivers or sends by post the declaration to the vaccination officer of the district. It is clear, therefore, that if the father has the legal custody of a child and neglects to cause the child to be vaccinated, he is not exempt from penalty unless he himself makes a declaration of conscientious objection.

The Minister considers it important that vaccination officers should be accurately informed as to the law on this point, and that the responsibility of parents and guardians should be made absolutely clear. The statement also points out that a vaccination officer should scrutinise every statutory declaration which he receives with a view to satisfying himself that the declaration is in all respects in order, and that the duty of taking proceedings for enforcing the provisions of the Vaccination Acts is imposed upon vaccination officers without any directions from the Ministry or the guardians, but it enjoins that the guardians should ascertain from time to time whether those officers are performing these duties, and report to the Minister any case of continued neglect on the part of a vaccination officer. In present circumstances the Minister considers it essential that proceedings should be taken in every case of default.

An Order has been made under the Vaccination Acts prescribing a new form of notice of the requirement of vaccination, in substitution for Form A contained in the First Schedule to the Vaccination Order (No. II.), 1907. The effect of the Order is to eliminate from Form A the form of statutory declaration, and to provide that forms for this purpose may be obtained from vaccination officers. The Order will come into operation on Sept. 1st next, and the necessary forms will shortly be forwarded to registrars of births and deaths, and to boards of guardians for distribution to vaccination officers.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

XXX.—THE TREATMENT OF THE HYPERTROPHIED PROSTATE.

A MAN with a hypertrophied prostate presents a more difficultly soluble problem in treatment than a superficial examination of his condition would lead us to expect. On the one hand, it has now been indisputably proved that the average expectation of life is greater amongst those patients who submit to operation under modern conditions, whilst, on the other, it cannot be denied that there is an immediate mortality which is probably larger than we are apt to recognise, our judgment being influenced on the favourable side by the perusal of the results of a very limited number of master operators. The prostatic's troubles are at first purely a local mechanical disturbance of bladder action, but when the kidneys become damaged by being compelled to secrete against great pressure, a disturbance of function of every vital organ in the body supervenes. There is a toxæmia from imperfect elimination, from the effects of which no tissue can escape. The kidneys are damaged most, so that there may not be the slightest reserve on which to call to face the exigencies of the most simple operative procedure. The muscular power of the heart is diminished, whilst the lungs, partly from the lowered circulatory efficiency, and partly from the depressed power of resistance, which they share in common with all other tissues, are prone to suffer from infective lesions. The prostatic is a generally ill man, and often, despite his apparently healthy condition, is living precariously on the brink of a catastrophe, which may be precipitated, only too surely, by ill-timed or ill-advised surgical treatment.

The Choice Between Catheter Life and Operation.

Since it is exceptional for a catheter to be used for any length of time with impunity, catheter life should never be recommended, unless there is some very serious and irremovable objection to operation, such as the presence of diabetes, advanced heart disease, carcinoma, hemiplegia, or other grave illness.

At what stage of the disease does it become necessary to advise operative treatment, or, as the case may be, catheter life? The answer to this is: 1. When the obstruction to the passage of urine has thrown such a stress upon the bladder musculature as to cause it to lose its power of obliterating completely the lumen of this viscus, and of closing the orifices of the ureters during micturition. This is usually the case when the residual urine amounts to about three ounces. 2. When the patient's health is being undermined by being awakened from sleep at frequent intervals for the purpose of micturition, a condition of bladder irritability which is sometimes set up by a prostatic adenoma still small in size and not causing very great urinary obstruction. Where the residual urine is only one or two ounces, relief may be given to the patient if he follows a careful régime, avoiding exposure to cold and damp, and the use of alcohol and highly flavoured foods; he must not overwork and must have a sufficiency of sleep. But always before acceding to this line of treatment it must be determined by appropriate tests that serious general damage has not already taken place.

If, perforce, catheter life must be installed, it is preferable that the patient should have a male attendant who can carry out the necessary manipulation with all regard to aseptic dictates; but should this not be possible, the patient should receive meticulous instructions in the technique of catheterisation. Gum-elastic coudé catheters are the best. When there is little residual urine and a fair power of expulsion remains, two passages of the catheter in 24 hours will suffice, one immediately before retiring to bed. After use the catheters should be washed, drained, dried, and placed in a tube, in the bung of which is a compartment containing paraform powder, for 24 hours. Therefore two, or better three, sets of catheters, should be provided. Another method of sterilising, about equally effective and equally troublesome, is by boiling. The new gum-elastic catheters will stand boiling for a short time, 1–2 minutes. A portable boiler in which the catheters hang suspended can be obtained. As a lubricant a jelly containing tragacanth and oxycyanate of mercury is recommended. This can be obtained sterilised in collapsible tubes. When there is no voluntary power of passing urine, so that many catheters are necessary, or when the passage of a catheter is impossible or painful for the patient, it is better to make permanent suprapubic drainage under local anæsthesia, and to provide him with an attachment for collecting urine. In most patients the consideration of operative removal comes to the fore.

Examination Preliminary to Prostatectomy.

In connexion with the actual operation of prostatectomy there are certain outstanding features. The bleeding cannot be controlled exactly as it can, for instance, in a gastro-jejunostomy, whilst the total amount of blood shed cannot be foretold; a rather ragged cavity is left, during the healing of which necrosed tissue must be absorbed and throw a strain upon the excretory organs; sepsis of the cavity inevitably occurs, though to a variable degree. We must, therefore, determine, as far as we can, the reserve powers of two great systems, the circulatory and excretory. Will the heart be able to maintain the circulation after the loss of blood which must occur in connexion with the operation? Are the kidneys working up to the limit of their capacity or will they be able to carry on when the autolysed products of destroyed tissue are absorbed into the blood-stream? Will the immunity response of the patient be equal to dealing with the inevitable infection? We have no direct measure of the powers of defence to infection, but we can carry out investigations which will help us to judge of the efficiency of the circulation and excretory apparatus. We should try to ascertain: (1) The reserve power of the heart; (2) the hæmoglobin value of the blood; (3) the blood pressure; (4) the quantity of urine passed in 24 hours and its specific gravity; (5) the reserve power of the kidneys. An index of the resources of the heart is the reaction of the patient to exertion, the presence or not of dyspnœa after a moderately sharp walk or on going upstairs. We can get no exact measurement of this function in reserve; we can only arrive at a clinical impression. Loss of blood will mean increased work for the heart. The higher the blood pressure, the less able will the heart be to respond. The toxæmia which results from the damage to the kidneys, as in chronic interstitial nephritis not dependent upon disease of the prostate, affects the bone-marrow and interferes with the birth of new red corpuscles. The patient is doubly handicapped to withstand a hæmorrhage; he suffers from anæmia to begin with and is crippled in his efforts to replace the lost red corpuscles. If the hæmoglobin percentage is below 60, it is a risky procedure to attempt a prostatectomy. Polyuria with low specific gravity and low urea content points to the existence of chronic interstitial nephritis. By flooding the circulation with urea and thus throwing a strain upon the kidneys we are able to estimate their reserve power. H. Maclean's urea-concentration test is the simplest, most practical, and most reliable method of doing this. If, in response to this test, the kidneys are able to secrete urine containing 1·5 per cent. of urea, they are not likely to fail after operation, and a considerable number of cases can be operated upon, other factors being favourable, if the percentage of concentration is down even to one. The phenol-sulphonephthalein test of renal function is also useful, but is less simple and reliable.

The Institution of Preliminary Drainage.

If the tests are unfavourable to operation, it is possible to improve the patient's condition so that eventually he may be submitted to it without undue risk. The secret of such treatment is to relieve the pressure against which the kidneys have to secrete, leaving the prostate in situ. This is done by an in-dwelling catheter, or by suprapubic drainage. It is astonishing what recovery will take place from this treatment. A catheter should be tried first. Suprapubic drainage should be instituted (1) if catheterisation is impossible; (2) if the urethra will not tolerate an in-dwelling catheter; (3) if there is much urinary sepsis; (4) if the period of drainage has to be a prolonged one. Ten days or a fortnight of drainage will often suffice materially to improve the urea-concentration figure, but sometimes a delay of several months is necessary before prostatectomy can be safely undertaken. A word of caution must be given about the management of cases where there is much residual urine or overflow incontinence. Evacuation of the bladder must be gradual or uræmia may quickly follow. In such patients either a catheter should be passed every four hours and a pint of urine withdrawn until the bladder is empty, when a catheter may be tied in, or, what amounts to the same thing, a catheter is tied in the urethra and the plug removed every four hours to evacuate the same amount. Should suppression of urine follow a too rapid emptying, the symptoms of uræmia may be induced to disappear by filling up the bladder again with boric lotion.

Certain complications, such as retention of urine, hæmorrhage, and epididymitis, may occur in the prostatic; space forbids discussion of their treatment. For retention a hot bath, with hypodermic of morphine gr. ¼, should first be tried, followed by gentle attempts at catheterisation; aspiration above the pubes or the insertion of a self-retaining catheter into the fundus of the bladder are last resorts. Rapid removal of urine is dangerous.

The Choice of Method for Removal of the Prostate.

It is not possible to say at present which is the better of the two methods; advocates of both exist and almost equally good statistics have been published. The suprapubic operation is certainly easier and the results are in the main good. In the hands of experts the perineal operation appears to show a slightly lower mortality and to afford better opportunity of controlling hæmorrhage; certainly drainage of the septic prostate cavity is more efficient. The two great drawbacks cited against the procedure, incontinence and urethro-rectal fistula, disappear with the increasing skill of the expert. The presence of a stone in the bladder, discovered by cystoscopy, which should always be performed when practicable, indicates the suprapubic route.

The Results of Prostatectomy.

The urinary fistula, perineal or suprapubic, is usually closed within three weeks and the patient returns to a state of health unknown to him for years. Some patients, however, still complain of a certain nocturnal frequency of micturition. A much more troublesome condition is the persistence of sepsis, from which the patient never recovers. In such individuals it is probable that the kidneys were badly infected at the time of the operation. Not very commonly a stricture follows the enucleation of a prostate. The obstruction is sometimes at the triangular ligament, at others at the bladder base, and may need a cystotomy for its proper treatment. On the whole, however, it may be said that the ultimate results of removal of the prostate are extremely good. They are incomparably better than partial excisions done by intra-urethral instruments. Recently a revival of such incomplete removal has taken place, substituting the diathermic cautery for the punch or actual cautery. It would be premature to criticise the results of such a recent technique, but the indications are that, like the older methods, it has only a limited application.

CHARLES A. PANNETT, M.D., B.S.Lond., F.R.C.S.Eng.
Professor of Surgery, St. Mary's Hospital Medical School.

Special Articles.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING AT PORTSMOUTH.

THE annual summer gathering of the British Medical Association opened under ideal weather conditions at Portsmouth on Friday, July 20th, when the Representative Body held its first session in the Municipal College, adjoining the Town Hall.

CIVIC WELCOME.

At an early stage in this session the Lord Mayor of Portsmouth, Alderman F. G. FOSTER, attended to bid hearty welcome to the Association. He was introduced by the President-Elect, Mr. C. P. CHILDE, F.R.C.S., who pointed out that it was the Lord Mayor to whom, as chairman of the Education Committee, the loan of the College was due. Mr. Childe also introduced Mr. C. A. SCOTT RIDOUT, F.R.C.S., hon. local general secretary, as the pivot on which the whole meeting was to revolve. Alderman Foster said that it was his brother, the late Sir Scott Foster, who had extended the civic welcome to the Association at its last meeting at Portsmouth in 1899. He spoke of the growing public interest in health during the intervening 24 years, telling of the local wiseacre who complained of "that fool of a medical officer sniffing round, when here I have been living in Milton for 40 years and never seen a microbe." Dr. R. WALLACE HENRY, chairman of the Representative Body, said that the Association had three great aims: first, the consolidation of medical knowledge and the finding of new methods by which disease might be cured and its incidence prevented; secondly, to discover the best methods by which advances in medical science might be passed on to the public; and thirdly, to secure to those engaged in the work such conditions, economic and other, as would free them from needless anxiety and enable them to put forth their best work. It had been said that good work was its own reward; he would add that better work came from better reward.

REPRESENTATIVE MEETING, FRIDAY, JULY 20TH.

Dr. WALLACE HENRY, of Leicester, took the chair at 10 A.M. After apologies for absence and the acceptance of certain modifications in the standing orders, Mr. J. Basil Hall, M.Ch. Camb., was elected President of the Association for 1924–25, the annual meeting of 1924 to be held at Bradford. The annual meeting of 1925 was fixed for Bath. Sir David Drummond, president in 1921–22, was elected a vice-president, as also Mr. G. A. Syme, M.S., of Melbourne, chairman-elect of the Australasian Medical Congress, Dr. R. H. Todd, of Sydney, Dr. H. E. Gibbs, hon. secretary of the New Zealand branch, Dr. W. Watkins-Pitchford of Johannesburg, and Dr. D. C. Watt of Pietermaritzburg. It was announced that Sir William Macewen was going in November as ambassador to the Australasian Congress.

PUBLIC HEALTH POLICY OF THE B.M.A.

The meeting at once settled down to consider the relations between the British Medical Association and the Society of Medical Officers of Health. These had been under discussion since the Cambridge meeting in 1920, and the negotiations had resulted in the drawing up of a definite scheme described by Dr. R. A. BOLAM, chairman of the B.M.A. Council, as an agreement between the medical profession as a whole and those who have the duty of carrying out public health functions under authority. There is at present no provision in the constitution of the Association for ensuring that the opinions of members working as whole-time officers for public health authorities shall be made known directly to the Association, and the B.M.A. Council, in the course of its investigations,

became convinced that it would be for the good of all if representatives of the public health service were brought into direct contact with people doing other kinds of medical work. First, the report of a conference of representatives of the two bodies was submitted for the approval of the meeting. This report runs as follows :—

Report of Conference between B.M.A. and Society of M.O.H.'s on Public Health Medical Services.

I. The Conference has reviewed the obligations and powers imposed and conferred upon local authorities by Acts of Parliament in regard to health administration and the relative position of medical officers of health and general practitioners in schemes of health services. These obligations and powers include :—

(*a*) Medical survey or inspection.

(*b*) Treatment.

II. Local authorities must give effect to their legal obligations. The extent to which they exercise their powers is in the discretion of the local authority subject to the prior approval of the appropriate central Government department. The Conference is of opinion that benefit would be likely to result from a closer coöperation of the local medical profession with the local authorities' schemes of medical survey or inspection and treatment.

III. The Conference is in general agreement with the view of the Consultative Council on Medical and Allied Services as stated in that part of paragraph 6 of its interim report which recited :—

"Preventive and curative medicine cannot be separated on any sound principle and in any scheme of medical services must be brought together in close coördination. They must likewise be brought within the sphere of the general practitioner, whose duties should embrace the work of communal as well as individual medicine."

Advice to Local Authorities.

IV. The Conference is therefore prepared to advise local authorities :—

(1) That where private general practitioners place their opinions before local authorities on any proposed scheme of medical survey or inspection and treatment, their representations should have due consideration by the local authority in order that it may be ascertained how far it is practicable or desirable to give effect to their view.

(2) That those engaged in general practice must either be prepared to accept responsibility for the treatment of such of their private patients as are discovered by medical survey or otherwise by the local authority to be in need of treatment, or they should agree that treatment should be undertaken by the local authority without regarding such medical provision as an encroachment on their practice. To this end persons found to be in need of treatment should, in the first instance, be referred to their private medical practitioner, or if they have no regular medical attendant they should be advised to consult a private medical practitioner.

(3) Private practitioners should assist local authorities by intimating their willingness or otherwise to undertake the treatment of patients discovered in the manner stated to be in need of treatment.

Centres and Clinics.

V. That practitioners, and by arrangement medical students, should have access to centres and clinics established by local authorities, in order that they may gain such experience as the centres and clinics afford.

VI. That private medical practitioners should be able to refer to clinics and centres for advice and treatment patients who would thus be most appropriately provided for.

VII. That payments or charges, if any, made in respect of medical treatment should be either voluntary or of such a character as will not deter persons from seeking advice and obtaining early treatment.

VIII. Centres and clinics should be established and administered for the benefit of :—

(*a*) Those who are unable, for some reason, to obtain treatment from a private doctor, and

(*b*) Those who, as a result of supervisory medical work undertaken by the local authority, are discovered to be ailing, and for whose ailments treatment would not be sought unless it were provided by the local authority.

But treatment at centres and clinics should be such as can be actually given therein, and should not include any treatment that makes domiciliary attendance advisable or involves a stay of more than 48 hours at any clinic where beds are provided.

Treatment by Private Practitioners.

IX. The Conference is of opinion that in the interests of harmonious working and the acquirement of clinical experience, the possibility should always be considered of clinical work done for the public health authority being carried out through the agency of private practitioners where conditions are suitable.

X. For the purpose of a better understanding, the Conference desires to state further :—

(1) That private general practitioners or consultants accepting offices under local authorities must realise that the duties of these offices require to be fulfilled strictly in accordance with the conditions of the appointments and in priority of all other engagements.

(2) That the health policy is settled by local health authorities, not only on medical grounds, but after due regard has been given to the closely-related questions of administration and finance, local conditions and other relevant considerations.

(3) That the medical officer of health should so far as possible secure the coöperation of the local medical profession in the discharge of his duties.

(4) That the final decision of the health policy must always rest with the local central authorities.

(5) That it is the duty of the medical officer of health to ensure that effect is given to the decisions of those authorities.

Scheme for Coöperation with M.O.H.'s.

This report was agreed to without further discussion. Dr. BOLAM then proposed certain alterations in the constitution of the B.M.A., involving corresponding alterations in the constitution of the Society of M.O.H.'s, the whole being a contingent agreement which precluded the Society of M.O.H.'s from independent medico-political action. The recommendations of the B.M.A. Council were as follows :—

I. (*a*) The B.M.A. so to alter its constitution as to allow of the *direct* representation of such of its members as are in the Public Health Service, on its various governing bodies ; and

(*b*) The Society of M.O.H.'s so to alter its constitution as to allow of the Association being directly represented on the Council of each branch and on the Central Council of the Society.

Note.—It is eminently desirable that the representatives on the Council of the Association, or Society, should be members of the other Council.

II. The Society of M.O.H.'s to continue to formulate and urge any medico-political policy that it wishes, and where such policy is of mutual concern to both the Society and the B.M.A., the Society will present that policy to the Association through its direct representatives, and when any such medico-political matter has been finally determined by the annual representative meeting all action consequent thereon shall be taken by the B.M.A. The Society shall refrain from taking any action in support of a divergent policy until after the decision of the annual representative meeting, but in the event of the Society thereafter feeling constrained to consider the taking of separate action, such action shall not be taken until the Councils of the Association and the Society have conferred together thereon.

III. As a condition of, or preliminary to any agreement on the above lines, *if desired*, a common declaration of policy on general lines to be promulgated by both Association and Society, and a common arrangement in general terms as to certain points with regard to salaries and the method of securing them to be agreed upon.

Prolonged discussion took place on this scheme, started by an amendment from Brighton, disapproving of any alteration in the constitution of the B.M.A. which would secure for certain of its members dual facilities for voting and representation. The Association, it was argued, had been built up on an individual basis, and to change this was to go back on the democratic attitude of 1902. If 1800 public health service members were given special privileges, the same would be claimed by other groups such as Poor-law, insurance, medical women, service branches, and so on. The B.M.A. Council frankly admitted the small sacrifice of democratic principle involved in the bargain, but justified it as the only practical way of preventing the public health medical service from ploughing its own lonely furrow or combining for political action with administrative branches of the health service. The meeting agreed with the Council by refusing the Brighton amendment and passing the change in constitution by the necessary two-thirds majority.

Scale of Minimum Salaries for P.H. Medical Officers.

A definite scale[1] of minimum commencing salaries for medical officers in the public health service was then put to the meeting by the chairman of the B.M.A. Council. This scale differs substantially from that submitted at Cambridge in 1920. In its earlier form current civil service bonus and yearly increases were integral portions of the scheme. In view of the present economic position these are now accepted as guiding principles but are not obligatory. The minimum commencing salary for a junior officer has been meanwhile raised from £500 to £600, inasmuch as it was shown that progressive health authorities were now requiring evidence of special experience before a practitioner could hope to get on the short list for one of the junior appointments. The M.O.H. of a large county, with a staff of nearly 30, stated that the average age of his juniors on appointment was nearly 40, and that only one of them (appointed during the war) was without special experience on appointment. The B.M.A. Council came to the conclusion that if this special experience was to be made a sine qua non for appointment, it could not be suggested that £600 was an extravagant salary, particularly as the prospect of advancement is poor. The scale as now proposed also differs in the greater differentiation in the salaries for the chief M.O.H., to begin at £800 for a population of under 35,000—the great bulk of appointments being between £800 and £1100.

Dr. BOLAM, in moving this scale, pointed out again that much had been said regarding £600 as a commencing salary for a "young raw graduate," but this term no longer described the public health service entrant, for he or she must be fully qualified (six years) plus the D.P.H. plus special experience in some department—e.g., tuberculosis, school hygiene, M. and C.W., and was then years removed from qualification. The chances of getting £1000 or over in the service were small; he put them at 1 in 8 (wishing to be moderate); Dr. C. SANDERS at 1 in 14. The motion was carried by the necessary two-thirds majority. The Council then accepted an instruction to meet representatives of local authorities and to make such alterations in detail as might be necessary to secure an agreed scale.

Amendments in the by-laws were then passed rendered necessary by the decision to admit direct representation of public health service members on the governing bodies of the Association, the following interpretation being accepted:—

The expression "public health service member" means a member of the Association who is permanently employed in the whole-time medical service (other than service at a lunatic asylum) of the council or education authority of any county, county borough, municipal borough, metropolitan borough, burgh, urban district, rural district, or parish, or port sanitary authority in the United Kingdom.

Medical Defence for Members of the B.M.A.

On a motion by Warrington and St. Helens—

regretting that the B.M.A. Council had not seen its way to recommend the alteration of the Articles of the Association so that this paramount duty might be undertaken either by the Association itself or by its incorporation with one or

[1] *Minimum Commencing Salaries for Public Health Medical Officers.*

RESIDENT MEDICAL OFFICERS .. .. .. DEFINITION.—These are Medical Officers employed in Hospitals, Sanatoria, or other Institutions without responsibility for the work of other Medical Officers. *Note.*—Where the Appointing Authority limits the appointment to a term not exceeding one year and not renewable, this salary shall not apply.		£350 plus emoluments.
MEDICAL OFFICERS EMPLOYED IN DEPARTMENTS. DEFINITION.—These are Medical Officers without responsibility for the work of other Medical Officers, but who shall have had at least three years' experience in the practice of their profession subsequent to obtaining a registrable qualification.	Working directly under a Senior Medical Officer.	£600
SENIOR MEDICAL OFFICERS IN CHARGE OF DEPARTMENTS—e.g., Port Sanitation, School Medical Departments, Tuberculosis Departments, Mental Deficiency Departments, Maternity and Child Welfare Departments, Venereal Disease Departments, or any other similar department or combination of departments, and Medical Superintendents of Hospitals, Sanatoria, or other Institutions. DEFINITION.—These are Medical Officers who are in charge of departments and are directly responsible to the Medical Officer of Health or otherwise.	Without Assistants. With 1 Assistant 2 3 4 5–6 and for every completed two or less.	£750 £900 £950 £1000 £1050 £1100 an additional £50
DEPUTY, OR CHIEF ASSISTANT, MEDICAL OFFICERS (Hospitals, Sanatoria, or other Institutions and Departments).		A salary equal to 60 per cent. of the salary of the Medical Superintendent or Senior M.O. in charge but not less than the salary of a M.O. employed in a department.
DEPUTY OR ASSISTANT MEDICAL OFFICERS OF HEALTH. DEFINITION.—A Deputy or Assistant Medical Officer of Health is a medical officer duly appointed as deputy or assistant medical officer of health by the local authority to assist the medical officer of health in the general administration of the health department and the carrying out of the various Acts, by-laws, orders, rules, regulations, &c., required to be or usually administered by the medical officer of health; the title deputy assistant medical officer of health to be limited to medical officers carrying out these general duties.		A salary equal to 60 per cent. of the salary of the M.O.H. but not less than the salary of next grade of medical officer in the department.

—	Population.	Minimum commencing salaries per annum.
MEDICAL OFFICERS OF HEALTH	Under 35,000	£800
	,, 50,000	£900
	,, 75,000	£1000
	,, 100,000	£1100
	,, 150,000	£1200
	,, 200,000	£1300
	,, 300,000	£1400
	,, 400,000	£1500
	,, 500,000	£1600
	,, 600,000	£1700
	Over 600,000	£1800

Notes.

(A) These salaries are net, any expenses necessitated by the duties being provided in addition.
(B) Population means population at the latest annual report of the Registrar-General.
(C) No existing officer should be prejudicially affected by the operation of the scale.
(D) ANNUAL INCREMENTS should be at the rate of 5 per cent. per annum, rising to 40 per cent. above the minimum basic rates.
(E) BONUS. The current Civil Service cost of living bonus should be applied to the foregoing scales.
(F) That the salaries of Medical Superintendents of Poor-law Hospitals should be as for Senior Medical Officers in charge of Departments as set out above.
(G) That salaries are to be minimum salaries for whole-time service.
(H) That Medical Superintendents of Institutions, and in suitable cases Chief Assistant M.O.'s, should, in addition to their salaries, be supplied with a house.
(I) That there shall be no differentiation of salary on account of sex.
(J) That all exceptional work not recognised as normal duties to the subject of additional remuneration.
(K) That if marriage be deemed by the local authority a disqualification for a medical appointment the same shall be specifically stated when the vacancy is advertised.
(L) That in placing existing officers in accordance with these salaries, years of service and merit should receive recognition.
(M) That all Medical Officers of local authorities should be subject to similar security of tenure as is provided for a Medical Officer of Health under the Public Health (Officers) Act, 1921. But where the appointing authority limits the appointment to a term not exceeding one year, and not renewable, this provision shall not apply.

more of the existing defence societies; further, that this meeting is of opinion that the individual defence of members in professional matters should be one of the functions of the Association,

Dr. J. S. MANSON reminded the meeting that the matter was first discussed in 1896, was the subject of resolutions at Swansea in 1903, and at Newcastle in 1921. The Wood-Hill case had given great impetus to the demand for individual defence. There was a very strong expression of opinion that it was the function of the Association to protect its own members. But the solicitor to the Association pointed out that (1) legally the Memorandum of Association did not include individual defence, and the Home Office would have to be approached for permission to apply to the courts for alteration of the constitution; and (2) existing defence societies were so well established that it was now hardly practicable to get individual medical defence within one fold. The motion was lost by a large majority.

Election of Members of Council.

The election of 12 members of Council by grouped representatives was announced as follows: Dr. G. B. Hillman, Dr. F. Radcliffe, Dr. J. W. Bone, Dr. T. Ridley Bailey, Mr. W. McAdam Eccles, Dr. W. Paterson, Dr. C. E. S. Flemming, Dr. S. Morton Mackenzie, Dr. C. E. Douglas, Dr. J. McGregor Robertson, Dr. R. B. Mahon, Dr. J. S. Darling; all being unopposed except Dr. Flemming and Dr. Douglas.

The meeting adjourned at 6 P.M.

REPRESENTATIVE MEETING, SATURDAY, JULY 21ST.

HOSPITAL POLICY OF THE B.M.A.

On Saturday morning the report of the B.M.A. Council on hospitals was taken, in order to give the meeting an opportunity of discussing the policy of the Association with regard to

Contributory Schemes

of hospital benefit. After an expression of regret at the loss by death of Sir James Galloway, a valued member of the Hospitals Committee, a motion by the chairman of the Hospitals Committee, Mr. N. BISHOP HARMAN, to define (for the purpose of the present discussion) a contributory scheme as "a scheme to which contributions are made for which there is to be a stated or implied return," was carried. Mr. Harman showed how wide an interest had been created by hospital policy of the Association enunciated last year at Glasgow. A motion by Buckinghamshire to the effect—

That unless it can be clearly shown that the amounts collected for hospital benefits by contributory schemes are in excess of the amounts required for the upkeep and maintenance of the hospital, no part of the moneys thus collected can fairly or properly be claimed by the honorary medical staff,

led to animated discussion on the purpose for which the individual pays his contribution; in practice it was generally regarded as impossible to distinguish between payment for maintenance and payment for treatment. The worker's attitude to the hospital doctor was apt to be "We pay 1*d.* a week, we buy *you*." And Mr. H. S. SOUTTAR said it was perfectly clear that the contribution was paid "for treatment in hospital." In a genuine contributory scheme Mr. Harman contended there was no difficulty in finding money for both, but the Hospital Savings Association was simply a means of exploiting the medical profession. The motion was lost.

Medical Staff Funds.

Mr. HARMAN then moved the amendment of a paragraph in the Hospitals Report so as to read:—

Income derived from gratuitous contributions, existing assets, endowment funds, and the like, are not liable to assessment for medical staff fund purposes, but all payments made for hospital benefit are, in fact, payments towards all the services of the hospital whether medical or ancillary, and therefore a percentage of such payments should be passed into a fund which is at the disposal of the honorary medical staff of that hospital. Small payments of individual patients not recoverable from third parties may be assessed in a nominal percentage only as a token recognition of the policy enunciated.

"They do, in fact, pay to see the doctor," said Mr. Harman in his brief introductory statement. An amendment was moved by Reigate to the effect—

That, in the absence of any great body of opinion to show that the members of the Association, and more particularly members of the medical staffs of hospitals are in favour of the policy laid down in the Hospital Report, the further consideration of the policy proposed be postponed until next annual representative meeting; and the Council be instructed to inquire in the meanwhile of all staffs of hospitals with 30 beds and over, which of the various sources of income, if any, of a hospital should be required to make a contribution towards a staff fund.

Dr. S. MORTON MACKENZIE, in moving postponement, said that the policy might be sound, but it was better to go slow, for many members of voluntary hospital staffs would certainly refuse the "token recognition" or any other.—Sir RICHARD LUCE called attention to the difficulties caused by varying conditions in the North and South. In the North a large part of the hospital funds came from workmen's contributions collected at the source and was untaxable under the resolution; in the South payment was directly made by patients and could be taxed. The capitation fee of insurance and friendly societies was on the debatable margin. He thought the Association would not carry the present hospital staffs with them.—Dr. P. MACDONALD supported any measure of postponement in view of his well-known conviction that voluntaryism could never supply an adequate hospital service.—Mr. W. MCADAM ECCLES opposed postponement for the reason that contributory schemes were springing up all over the country, and it was for the Association to guide public opinion.—Dr. H. B. BRACKENBURY pleaded for a definition now of staff funds so that returns might be obtained from the hospitals concerned.—Mr. SOUTTAR said that every patient at the London Hospital was now assessed at what he could pay, up to £5 5*s.* a week. Was it the duty of the staff to treat all these paying patients gratuitously?—The President-elect, Mr. CHILDE, feared that the charitable public, on whom they still relied much, would withdraw their subscriptions when they heard of the staff fund. He thought it should not be beyond the constructive powers of the Association to arrange a scheme to provide medical treatment for the class between the poor hospital patient and the well-to-do while maintaining the voluntary principle intact.—Sir JENNER VERRALL appealed to the mover not to split the profession on this issue.

In the event the amendment for postponement was carried by 84 votes to 70, and on Dr. Brackenbury's initiative the reasons for postponement were deleted from the amendment when passed as a substantive motion.

Definition of the Voluntary Hospital.

On a motion by Bolton to amend the definition of a voluntary hospital and asking the Association to maintain that "the essential feature of the voluntary hospital system consists in maintenance wholly or mainly by voluntary contributions and is not necessarily related to the conditions of service of the medical staff," the criterion of independent voluntary management was frankly described as the "charwoman definition." Dr. E. J. TOYE (Barnstaple) insisted that a voluntary hospital is one in which the patient is treated gratuitously. He pictured the learned investigator of the future who unearthed the Bolton resolution being led to the conclusion that the ancient Britons had maintained temples which they called voluntary hospitals and that in these temples they kept gods which they tried to pacify by offerings known as voluntary contributions. The Bolton definition was rejected.

Contributory Schemes for Private Insured Persons.

On the invitation of the Brighton Division, which had sent up a closely reasoned memorandum dealing with contributory schemes for private insured persons, it was agreed without much discussion to

refer to the consideration of the Council the following points for definite decision next year with such interim action as was within the present range of its hospital policy :—

(*a*) The income limit scale to be such as is approved by the majority of the medical profession resident and practising within the area of the scheme.

(*b*) Free choice of doctor (attendant and specialist) by patient subject to consent of doctor to act.

(*c*) The scheme to be administered by a general committee representative of the interests concerned, and not by a voluntary hospital or other coöperating institution.

(*d*) The method of remuneration of medical specialists to be payment for work done.

(*e*) Medical remuneration for specialist's services to be what the local profession considers adequate having due regard to the services to be rendered and other conditions of the scheme.

(*f*) Adequate medical representation of the General Committee administering the scheme with recognition of the Division (Branch) of the British Medical Association as representative of the profession in the area of the scheme.

(*g*) The accommodation provided for in-patient treatment to be at recognised nursing homes, paying hospitals, or in accommodation of the nature of a nursing home in connexion with a voluntary hospital.

—these proposals being based on the fundamental points adopted for domiciliary National Health Insurance.

The British Medical Journal.

The B.M.A. Council reported that this year Sir Dawson Williams completes 25 years' editorship of the *British Medical Journal*. It was resolved and carried by acclamation—

That this meeting sends its heartiest congratulations to Sir Dawson Williams, upon the completion of his 25 years as Editor of the *British Medical Journal*, and wishes him health and success in carrying on that work.

To signalise the occasion Sir Dawson Williams is to be the guest of the evening at the B.M.A. Council dinner on Oct. 24th.

Scientific Work of the B.M.A.

In asking for approval of the section of the annual report under the heading Science, the chairman of the Science Committee, Mr. H. S. SOUTTAR, spoke of the peculiar character of the Association's research scholarships, in that scholars were not required to devote the whole of their time to research, but might hold concurrently junior appointments at university or hospital. The Council was proposing to make additional grants for approved schemes of post-graduate education undertaken by the branches. He referred to the valuable work of Mr. W. G. Spencer as honorary librarian, and of Prof. R. T. Leiper in preparing the "Bibliographical Index." He hoped that the new home of the Association would prove a centre for exchange of scientific ideas. Mr. E. B. TURNER thought that now war conditions were passing more money should be given by the Association for "direct culture." He had been struck by the high qualification and claims of the candidates for scholarships.

Representation of Medical Women's Federation on the B.M.A. Council.

A motion was proposed by Dr. BRACKENBURY and seconded by Dr. CHRISTINE MURRELL (Kensington) to the effect—

That the Council be instructed to prepare the necessary alteration in the by-laws to allow the coöption to the Council of a member of the Council of the Medical Women's Federation nominated by that body, and that in the meantime the Council should invite a representative of the Council of the Medical Women's Federation to attend its meetings.

Dr. Brackenbury said that for many years the M.W.F. had worked in complete harmony with the B.M.A. on matters of medical policy, and members of the M.W.F. had been coöpted on subcommittees of the B.M.A. He regarded the claim for special representation as valid, because (1) the M.W.F. formed a distinct body of practitioners with separate professional interests and ideas, (2) it was sufficiently numerous to justify representation, and (3) so scattered that representation on the usual lines was hardly feasible. But the motion he was putting might be too precise and categorical. Dr. Murrell said that while medical women did not desire as such any special franchise, nevertheless society forced upon them the separate consideration of certain matters, and it was then inconvenient for one council not to know what the other council was doing. Some method was required of solving a practical difficulty. Dr. C. O. HAWTHORNE (Marylebone) characterised the demand as simply one of sex representation without any element of vocation or reciprocity. A federation of red-haired practitioners would have an equal claim for special treatment. Dr. MACKENZIE besought the meeting not to go back on its Newcastle decision to reject a federal basis; it would certainly be a good thing to have a woman elected on the B.M.A. Council, but not for the M.W.F. to have a seat there by right. The Association already had 1300 women members while the Federation had but 800.

By consent of the meeting the original motion was withdrawn in favour of one proposed by Dr. E. W. G. MASTERMAN (Camberwell) and seconded by Mr. SOUTTAR—

That the Council be instructed to investigate what measures can be taken to ensure some means of representation of medical women on the Council of the Association.

This motion on being put to the meeting was lost by a large majority.

Public Health Matters.

A motion proposed by Dr. C. J. KIRK (Darlington)—

That the Council of the British Medical Association inform the Ministry of Agriculture and the Ministry of Health that in the opinion of the British Medical Association the Milk and Dairies Act, 1915, and the Tuberculosis Order, 1913, should be brought into operation at the earliest possible date,

was referred for consideration to the Council which was also requested, on the proposition of Dr. H. ROSE (Bucks) to call the attention of the Ministry of Health to the urgent necessity of isolating cases of advanced and infectious tuberculosis.

On a motion by Dr. J. W. BONE (Bedfordshire) it was resolved to express regret that "Summer Time" has been curtailed this year, as the British Medical Association is of opinion that it is beneficial to the health of the nation.

Mr. E. B. TURNER (Kensington) proposed, Dr. T. W. H. GARSTANG (Mid-Cheshire) seconded, and it was unanimously resolved—

That the Representative Meeting restates the policy of the Association, and the practically universal conviction of the medical profession, that vaccination efficiently performed in early infancy, and repeated after such intervals as may be deemed necessary during after-life, is the only certain preventative of small-pox. Owing to the distribution of an enormous number of unvaccinated persons in every part of the Kingdom it recognises the danger of a pandemic of this disease, and therefore urges the Government to take such measures—legislative, administrative, and preventive—as may be necessary to avert this peril from the community and should it do so, assures it of the whole-hearted support of the British Medical Association.

As a corollary to this resolution it was proposed by Dr. NOY SCOTT (Plymouth), seconded by Dr. H. L. HATCH (Harrow), and agreed that Government lymph should be supplied during an epidemic to all medical practitioners who apply for it and are willing to render a report on the results. Dr. J. A. MACDONALD expressed his belief that the Ministry of Health would readily grant this if the claim were pressed.

National Health Insurance.

Under this heading Dr. BRACKENBURY obtained from the meeting endorsement of the policy and action of the Insurance Acts Committee (see THE LANCET, 1923, i., 1226). The meeting firmly refused, by proceeding to the next business, to discuss Dr. FOTHERGILL'S amendment to the effect that the organisation of insurance practitioners (set out in a rather famous document known as M. 10) in the event of a refusal of the Government's terms was contrary to the honour and interest of the medical profession. Dr. Brackenbury did not believe that the contingency would arise. The attempt to define the

range of general practitioner service came in for criticism, especially in regard to the different abilities of the young and old, but Dr. Brackenbury pointed out that the schedule was not so much a definition of competence as of what an insured person under his contract was entitled to get from the insurance practitioner. An offer in this sense might be made, but it remained to be seen whether the Ministry of Health would accept it or not.

Election of Chairman and Deputy Chairman.

During the sitting the medical secretary announced that only one nomination each had been received for the chairmanship and deputy chairmanship of the Representative Body. Dr. R. WALLACE HENRY and Dr. H. B. BRACKENBURY were accordingly declared re-elected for the year 1923–24.

THE VOLUNTARY HOSPITALS DURING 1922.[1]

Sir Napier Burnett's fourth annual report on the voluntary hospitals in Great Britain (excluding the London area, where the hospitals are under the supervision of King Edward's Hospital Fund) was issued last week. The earlier publication of hospital reports this year has enabled the survey to be issued some three months in advance as compared with the report for 1921. Sir Arthur Stanley contributes a prefatory note, and two addresses by Sir Napier Burnett—the first dealing with contributory schemes as a feature of hospital finance, the second dealing with hospital treatment for middle-class patients, both delivered at the annual meeting of the British Hospitals Association at Sheffield in June of this year—are included as appendices. Chapters II. to VII. review the English voluntary hospitals, and Chapters VIII. to XII. relate to the Scottish hospitals.

Number of Patients Treated.

In Great Britain as a whole (excluding London) 643 voluntary hospitals supplied details of numbers of new patients treated during the year. These hospitals constitute 87 per cent. of the total number of hospitals, with 40,331 available beds (94 per cent. of the total possible); in all, 2,090,855 individual new patients were treated, at a total cost to the hospitals of £4,946,299. Towards this expenditure the hospitals received £4,868,615, leaving a deficit on the year's working of £77,684. The total number of new in-patients treated by the 643 hospitals was 501,945, and the total number of new out-patients 1,588,910. In England the 13 teaching hospitals were responsible for the treatment of 30 per cent. of the total number of patients treated in the 571 hospitals; in Scotland the six teaching hospitals were responsible for 51 per cent. of the total number of patients treated in the 72 hospitals.

Summary of Financial Situation.

During 1922 there was a great improvement in the finances of the hospitals. The excess of ordinary expenditure over ordinary income was £74,978, against £419,138 in 1921. These figures do not include any grants from the Voluntary Hospitals Commission, or free legacies, but refer solely to the ordinary trading or maintenance accounts for the year. Showing the two countries separately, for England and Wales the ordinary income failed to meet the ordinary expenditure in 1921 by £349,929; the corresponding deficit for 1922 was £28,085. In Scotland, in 1921 the deficit was £69,209, and in 1922 £46,893. The financial situation in the case of hospitals in Scotland is in reality much better even than these figures show, because, as is pointed out in the body of the report, the Scottish hospitals receive considerable sums in the form of free legacies year by year, with such regularity, that in a sense these legacies might be regarded as ordinary income. The above details dealing with the deficit refer to the 666 hospitals which forwarded their annual figures. Of the 666 hospitals, 378 (57 per cent.) had an excess of ordinary income over ordinary expenditure of £315,420, whereas 288 hospitals (43 per cent.) had an excess of expenditure over income of £390,398. The corresponding figures for 1921 were: Total number of hospitals reviewed, 656; of those, 335 (51 per cent.) had a surplus of £228,013, while 321 hospitals (49 per cent.) had a deficit of £647,151. These figures clearly show the progress made during the year. The surplus and deficit figures, as well as the number of hospitals, show a remarkable turnover. The progress made during the past three years is shown by the following percentage figures: In 1920, 44 per cent., in 1921, 51 per cent., and in 1922, 57 per cent. of hospitals had surplus of ordinary income over ordinary expenditure.

Notwithstanding the continuance of the financial depression throughout the country in 1922, deepening interest of the public in the voluntary hospital movement is shown by the following figures:—

	Ordinary income.		Decrease in ordinary expenditure.
England	£81,634 increase	....	£240,210
Scotland	£13,056 decrease	....	£35,372
Net increase	£68,578	....	£275,582

The remarkable reduction in ordinary expenditure, in which the majority of the hospitals participated, was in large measure accounted for by a fall of approximately 16 per cent. in the expenditure on provisions, 9 per cent. on surgery and dispensary, and 4 per cent. on domestic expenses. On the other hand, there was a slight increase of some 5 per cent. under the heading of salaries and wages.

Financial Heritage of Voluntary Hospitals.

A feature of the voluntary hospital system that is not always fully appreciated is the legacy towards the endowment of the hospitals that has come to the present generation from its predecessors. The 666 hospitals, with 41,043 available beds, dealt with in the present survey have invested funds to the total amount of £17,029,424, yielding an annual interest of £795,509, or £4·67 per cent. The hospitals in Scotland appear to receive a richer flow of legacies than the English hospitals.

Hospital Annual Reports and Vital Statistics.

A marked improvement in the form of presenting the hospital statistics is found in the annual reports for the past year, particularly in those of many smaller hospitals which have now adopted some modification of the uniform system of accounts, and publish an audited balance-sheet. Hospital statistics are of two kinds—(1) household or domestic statistics, and (2) vital statistics—relating to the patients treated; publication of the first group aids the improvement of hospital administration by comparison with other hospitals, and the second group is useful in that the advancement of clinical medicine and surgery is in no small measure dependent on case records. Hospitals could receive valuable guidance in the adoption of a uniform minimum standard of records to be kept, if such a standard were to be drawn up by some recognised authority, e.g., a joint committee set up by the Royal Colleges of Physicians and Surgeons.

Investigation of the Cause and Nature of Disease.

The daily hospital practice of voluntary doctors may be regarded as *defensive* medicine; in the work of the hospital laboratories medical science takes the *offensive*. It is still too little recognised by the public that the expanding science of preventive medicine owes its existence in large measure to work carried out in hospital laboratories. In large hospitals the laboratory accommodation has evolved during the past 25 years from a single room with one trained worker, until now there is a pathological and bacteriological institute attached to many of the hospitals and staffed

[1] The Voluntary Hospitals in Great Britain (excluding London): Fourth Annual Report for the Year 1922. London: 19, Berkeley-street, W. 1. 1s.

by highly-trained personnel. In smaller hospitals, the gratifying information is to be found in many annual reports that during the past year steps have been taken to establish some form of laboratory accommodation; quite a number of hospitals for the first time publish details of laboratory work, and in some instances coöperative arrangements have been arrived at between a number of neighbouring smaller hospitals, so that the services of a pathologist may be available for the group. In other instances it has been suggested that applicants for the post of resident medical officers should produce evidence of special training and equipment in pathological and bacteriological work, sufficient to enable them to undertake a certain standard of laboratory work.

Hospital Feeding.

The feeding of a patient is a very important factor in treatment, yet, speaking generally, it may be said that the subject has not hitherto received adequate attention. In a number of hospitals visited during the past two years, it was noted that the medical staffs were devoting considerable attention to this question of feeding, and had insisted on the establishment of a special kitchen committee to raise the standard of feeding in the hospital. The monotony of institution feeding cannot but react unfavourably upon the patient: more hospitals might adopt the idea of a kitchen committee, and it would be of great advantage were each large hospital to have a trained dietitian, who would work out for the doctor a diet suitable to the complaint of the individual patient. It is not, of course, suggested that this would be necessary for all patients. Increased attention, as above outlined, to the question of patient feeding, will probably raise the cost per bed, but any increase in the cost of provisions may be counterbalanced by a reduction on drugs. However, the public will never fail to respond to the call for additional money required in the improvement of the feeding of hospital patients.

The Cottage Hospital.

Chapter III. of the report contains some views set out at length on this subject. The question arises whether the cottage hospital idea has not been rather overdone. The steady falling-off in the number of occupied beds during the past three years lends colour to this idea; in England the percentage of available beds occupied was 69·43, and in 1922, 59·23; in Scotland the percentages were 77·16 in 1920 and 61·16 in 1922.

In the cottage hospitals in England and Scotland, on the average, approximately 2000 beds, out of a total of 5179, remained idle throughout 1922. Two suggestions are outlined whereby more use might be made of beds in rural hospitals—namely, (*a*) many of these cottage hospitals could negotiate with the large hospitals in neighbouring towns, to take in some patients in an early stage of their convalescence, and thus enable these overpressed town hospitals to overtake their waiting lists of patients; and (*b*) many cottage hospitals with empty beds could render excellent service to the local communities in which they are situate, by making arrangements to receive maternity cases, especially first cases, from the local villages around. Institutional provision for such work in rural areas is extremely limited; even the supply of trained maternity nurses in country districts is very inadequate. In agreeing to undertake this work, the cottage hospitals might render valuable assistance in reducing the present high rate of maternal mortality and morbidity.

Establishment of a Central Bureau of Information.

With the object of rendering further assistance to the voluntary hospitals, the Joint Council of the Order of St. John and the British Red Cross Society has established a central bureau of information on hospital matters, and a large number of hospitals have readily acknowledged their indebtedness for the assistance obtained from this source. The central bureau has also been utilised for hospital information during the past year by Government departments (War, India, and Colonial Offices), by several of the Voluntary Hospital Committees set up by the Voluntary Hospitals Commission, and also by the Governments of several of the Overseas Dominions.

The report contains many useful charts and tables.

A YEAR'S WORK OF THE SCOTTISH BOARD OF HEALTH.[1]

THE annual report of the Scottish Board of Health now before us is a fairly complete summary of the various branches of public health and medical work carried out in Scotland at the expense of public funds; and it may be profitably read by candidates for a diploma in public health, by public health officials and administrators, and by social workers in general. Its contents are comprised under five headings: sanitation, medical and allied services, housing and town-planning, Poor-law and public assistance, and miscellaneous; and points calling for quotation or comment are contained in each of these sections. In a prefatory statement attention is drawn to the demand for economy and the distress among large sections of the population, which while pulling strongly in opposite directions has resulted in an unprecedented expenditure from public funds to relieve social distress. That the unfortunate character of the first of these pulls has been realised is shown by the statement that some of the health services on which the ban of economy has been especially exercised are practically new services "that were only in the course of development when the need for economy arrested them." Fortunately, prior to this fitful stage, sanitation had vastly improved.

Medical and Allied Services.

The statistics of pulmonary tuberculosis are interesting in contrast with those of England. They show a slight rise of death-rate in 1915, a practically stationary death-rate in the next three years, followed by decline; whereas in England war excess of death-rate from this disease is shown during four years. It seems likely that the unfavourable circumstances of war-time were less operative in Scotland than in England. As in England, there is some evidence of reduction of prevalence of venereal diseases; and the statistics as to numbers of patients receiving treatment at public clinics do not support the alarmist views of those who advocate compulsion in regard to continuance of treatment. Of the patients ceasing to be treated in the year, 45 per cent. were discharged cured, 7 per cent. were transferred to other treatment centres, and 21 per cent. left after completing a course of treatment, but before final tests as to cure had been made. It is noteworthy that of the cases of "syphilis alone" over 11 per cent. were congenital syphilis, illustrating once more the vast field only very partially explored of familial preventive medicine which might be cultivated, irrespective of any question of formal notification of disease. The statistics as to extra-genital syphilis place casually acquired syphilis of non-sexual origin in its proper place of relative unimportance, as only 0·86 per cent. of the cases treated were of this type.

We should have welcomed further particulars as to the Scottish experience of vaccination. There is much needed a comparative statement of Scottish and English experience concerning the supply of vaccine lymph; and it appears desirable that in both countries the State provision of guaranteed calf-lymph to medical practitioners applying for it should receive serious consideration, along with the imposition of the obligation on all practitioners receiving the lymph to make an exact report of the result of each vaccination. Attention is drawn to the excessive puerperal death-rate in Scotland which there is "ground for believing . . . is one of the highest to be found among civilised countries." The subject is under

[1] Fourth Annual Report of the Scottish Board of Health, 1922.

consideration, and there can be little doubt that a large share of this mortality is preventable. A useful summary is given of the work of the Highland and Islands (Medical Service) Fund, provided by the Government, to supply medical services in areas in which otherwise this would be lacking. The mere physical difficulties in certain instances, even with a provided service, are almost appalling, as in a striking instance recorded in the report, in which a single visit entailed an absence of the doctor from his home during four days.

Milk-supply, Medical Benefit, Housing.

Attention is drawn to the valuable report issued by the Scottish Inter-departmental Committee on the laws, regulations, and procedure governing the sale of milk in Scotland. In this report the setting up of a legal minimum limit of fat content is recommended, a procedure which would cut the Gordian knot of serious administrative difficulty in the control of milk-supply. On the working of the National (Health) Insurance Act the report is optimistic, and the opinion is expressed that the work of administering the Act was carried out by societies and branches in an efficient and satisfactory manner, though note is made of the multiplicity of Acts and Regulations which have rendered this task unnecessarily difficult. No marked dissatisfaction with the working of medical benefit has been shown, and attention is drawn to the success of the district medical staff. The trend of movement of membership from friendly societies in the direction of the industrial and collecting societies is also noted—a movement of doubtful gain, if any.

The housing position continues unsatisfactory in Scotland as in England. Credit is given to the Government "cuts" in July, 1921, for the healthier condition in building costs; and the Scottish Board continue to take the larger view and insist on a reduction in costs. Nevertheless, the housing problem in Scotland is still a long way from being solved, and the shortage is stated in the report to be probably accumulating.

The section of the report dealing with Poor-law relief is necessarily its least satisfactory part. Not only is there no evidence of attempt to increase the preventive element in Poor-law administration, but no indication is visible of increasing effort to make Poor-law infirmaries more generally available and to separate them more completely from workhouses. These problems call for early attention, for which legislative as well as administrative reforms are required; but in present circumstances these important social measures will be difficult to secure. It may be hoped that the recent report of the Scottish Committee on this subject will lead to practical action.

NATIONAL ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS.

(*Concluded from p. 124.*)

FRIDAY, JULY 13TH.

Sir ARTHUR STANLEY presided over the meeting. The subject for the morning session was

Relative Prevalence of Tuberculosis among Workers in Different Trades: Methods which are Likely to Reduce the Incidence in Special Trades.

Prof. VICTOR WOROBIOF (of the University of Moscow) conveyed the greetings of the All Russian Tuberculosis Conference to this conference.

The discussion was opened by Prof. E. L. COLLIS (Mansel Talbot Professor of Preventive Medicine, University of Wales). Industry, he stated, has been accused of being in Great Britain the last stronghold of phthisis. There lies in this accusation a large element of truth, so far as adult tuberculosis is concerned. Nevertheless, the manifold influence exerted by modern industrialism upon the general health of the community, of which the prevalence of phthisis is a useful index, must be grasped before more direct influences exerted by certain occupations can be seen in true perspective. Generally speaking, the course of events appears to have been that, whenever the habits and customs of a community in which tuberculosis is endemic have been disturbed, the disease has increased in prevalence. The sociological changes covered by the words "disturbance of habits and customs" must be held to include food-supply in relation to the call for energy output, aggregation of population in great centres of industry, with regard to both housing conditions and places of employment, transport facilities, increase in the alcoholic habit, &c. Associated with this increased prevalence the age of maximum incidence of the disease is found to move from late life to early adult life. Then as the community settles down to the new conditions phthisis falls and the age of the maximum incidence recedes again to late life. Undoubtedly changes in habits and customs associated with the advance of modern industrialism have exerted a powerful influence upon the prevalence of phthisis. Three influences were at work conducing to phthisis. The first was the aggregation of individuals employed at sedentary work; the second the alcoholic habit; and the third exposure to certain dusts containing silica. On the other hand, hard work, mental or physical, outdoor life, and uncrowded indoor life in no way favoured the disease. Industrial prosperity resulting in better feeding, the avoidance of overcrowding, sobriety, and the suppression of dust were also potent preventives of phthisis mortality. Phthisis mortality in America had fallen in a remarkable way since prohibition.

Dr. G. B. DIXON (chief tuberculosis officer for Birmingham) dealt with pulmonary tuberculosis amongst brass workers. An examination, he said, of the mortality returns, which refer to males engaged in different occupations in England and Wales during the years 1910–12, showed that workers in the brass and bronze trade present a higher mortality rate of pulmonary tuberculosis than occurs amongst male workers in many other occupations. It is a mortality rate which approximates to that of occupations which have a recognised and ill-reputation, because of the excessive prevalence of tuberculosis amongst those employed in them. Workers in the dipping shops are exposed to the inhalation of acid fumes and to the weather, and they frequently stand on wet floors. Polishers work in an atmosphere containing an amount of dust, which varies according to the ventilation and cleanliness of the place in which they are employed. The dust is partly metallic and partly composed of a mixture of sand, and lime and textile fluff worn off the polishing discs. As a result many of them suffer from chronic bronchitis, pulmonary tuberculosis, and fibroid changes in the lungs. Simon and Kynvett call attention to the fact that amongst 1200 brass casters in Birmingham, there were not more than ten who were over 60 years of age, and in connexion with the superannuation fund of the Brass Workers' Association, from which casters at the age of 55 can derive benefit, only three men were enjoying this benefit.

The Registrar's death returns for Birmingham show that during 1921 there were 502 deaths from pulmonary tuberculosis amongst males of 15 years and upwards, and of this number 46, or 9·2 per cent., occurred amongst brass workers. Similarly, in the year 1922, there were 528 deaths from the same disease, of which 51, or 9·6 per cent., occurred amongst brass workers. These numbers were the largest for pulmonary tuberculosis associated with any occupation, during the period, notwithstanding the fact that brass work, although an important section of the city's industry, was not the one giving employment to the largest number of persons. The census return for the city in 1911 showed that there were 9879 males, exclusive of 1484 brass founders and 747 brass finishers employed in the trade. Undoubtedly, since that date the numbers had undergone some change, but so also has the mortality rate for pulmonary tuberculosis. In 1911 it was 1·14 per 1000, in 1920

it was 0·93, and in 1921 it was 0·97 per 1000 of the total population, and allowing for variation in the numbers employed in the trade and for the diminution in the death-rate from pulmonary tuberculosis, it must be conceded that in the years 1920 and 1921 the death-rate from this disease was much higher for brass workers than it was for the total population. If the injurious effects from this trade are to be reduced to a minimum adequate methods for ventilation must be utilised, and provision for the ready escape of fumes and dust must be forthcoming. In those processes where dust is produced, arrangements should be made for its removal and the prevention of its dissemination in the atmosphere. The figures relating to alcoholism and mortality amongst brass founders suggest the necessity for more temperate habits amongst this class of worker. The importance of satisfactory housing accommodation for those who work under conditions such as many brass workers experience is too obvious for comment.

Mr. G. A. ISAACS (general secretary, National Society of Operative Printers and Assistants) then read a paper dealing with the printing trade. He stated that it is now generally accepted that the prevalence of tuberculosis is relatively higher in the printing trades than in any other. Some authorities, he said, believed that the presence of lead in this industry was an important factor in the causation of tuberculosis. The Austrian Government's report on health conditions in the printing trades, published in 1909, refers to the fact that lead poisoning and tuberculosis go hand in hand. He blamed the former low standard of living for the prevalence of the disease among machine-room workers. An improved standard of life had brought about improved conditions. Hygienic conditions in machine-rooms had received attention, but they still await the introduction of a vacuum cleaner, as now so universal in American offices. He stated that, given more information and expert guidance, the printing industry would do its share towards improving conditions.

Dr. J. DOIG MCCRINDLE (medical officer of health and chief tuberculosis officer, Corporation of Northampton) spoke of a considerable incidence of the disease among boot operatives. He complained that sanatorium patients were not allowed to resume the work they knew, but were taught uninteresting and unremunerative outdoor employments which brought in a wage that was beggarly in the delicate condition of the patient. He suggested the setting up of workshops under skilled supervision, where the lighter, if not all, processes of bootmaking could be carried out by the patients.

Dr. H. SCURFIELD (late medical officer of health for Sheffield) dealt with tuberculosis in connexion with grinders. He stated that 50 per cent. of the grinders in Sheffield died of pulmonary tuberculosis. When the rate is split up, it is found that it is only the male death-rate from pulmonary tuberculosis which is high compared with the English rate. The female death-rate from pulmonary tuberculosis is much below the English standard. A comparison of the rates in the large towns show an extraordinary variation. He stated that he had for long thought the industrial factor very important, and he did not think it would have been possible for publicists to give but the quarter-truth, "Tuberculosis is a housing problem" if it had been generally recognised that the sex most in the house had a tuberculosis mortality only about two-thirds of that of the other sex. He made the suggestion that this Association confer with the Society of Medical Officers of Health, with a view to considering exactly what statistics would serve the purpose, so that in due course a proposition may be submitted to the Ministry of Health.

Dr. R. PRATT (Leicester), Mr. T. W. MCARA (secretary of the Newspapers Proprietors Association), Dr. REGINALD DUDFIELD (medical officer of health for Paddington), the MAYOR of West Ham, Dr. TRIMBLE (Belfast), and Dr. J. WHEATLEY (medical officer of health for Shropshire) also took part in the discussion.

AFTERNOON SESSION, JULY 13TH.

Sir ROBERT PHILIP (President of the Royal College of Physicians of Edinburgh) took the chair.

Dr. G. LISSANT COX (central tuberculosis officer, Lancashire County Council) opened the discussion on

Notification of Tuberculosis: Proposed Amendments of Procedure.

He stated that the compulsory notification of all cases of tuberculosis has now been in force for ten years, and may be regarded as the foundation on which public health measures are based. The object of the notification of persons suffering from tuberculosis, required to be made under the Public Health (Tuberculosis) Regulations of 1912 and 1921, is to make the medical officer of health aware of the existence of a case of infectious disease in his district so that appropriate measures can be taken in regard to the prevention of the spread of infection. Considerable attention has been drawn to the unknown infective cases of tuberculosis existing amongst the community, and the number of deaths from pulmonary tuberculosis which are reported for the first and only time at death, give some indication of the importance of this aspect of the disease. Special investigations carried out in Lancashire since October, 1920, give the following important results:—

(*a*) That so many as 43 of the 194 deaths in 1922 occurred in public institutions; (*b*) that in 25 per cent. of the remaining 147 the doctor was only called in attendance a matter of a few days prior to death; (*c*) that in only 7 per cent. of the 147 deaths there was apparently no reasonable excuse for non-notification; (*d*) that while it is possible to suggest that a large proportion of persons certified as dying from tuberculosis (all forms) but not previously notified as suffering from the disease, were wrongly diagnosed by the practitioner at the time of writing out the death certificate, there does not appear from our inquiries to be any large margin of error so far as pulmonary tuberculosis is concerned, and consequently the importance of the non-notification of these cases can be seriously discounted; (*e*) that in 47 per cent. of the 147 deaths notification was not made owing to a misunderstanding of the Tuberculosis Regulations, or to the belief that the case had already been notified.

From the above, Dr. Cox continues, it is clear that Article V. of the Public Health (Tuberculosis) Regulations, 1912, should be simplified by amending or repealing the qualification that a doctor shall not notify a case if he has reasonable grounds for believing that the case has already been notified.

Dr. DUDFIELD stated that nothing was to be gained by refusing to recognise the fact—that compulsory notification of tuberculosis had not achieved the success hoped for. Not only is notification incomplete, but too many certificates are received too late. Dr. Dudfield also proposed an amendment in Article V. of the Public Health (Tuberculosis) Regulations, 1912, viz., "if he has reasonable grounds for believing a case has already been notified . . . ." leads to omission when two or more practitioners treat a case, each looking to the other to notify. Again, when a patient whose case has been notified in one district moves to another, but remains under the care of the same practitioner, he thinks that further notification is not required. The latter reading of the proviso he considers wrong, as the proviso ends with the words (following immediately after those already quoted) "to the medical officer of health for the district within which the place of residence of the person is situate." He is of the opinion that the proviso ought to be repealed, thereby making every practitioner "attending or called in to visit" a case of tuberculosis responsible for the notification of the case and eliminating the leak which at present exists under the Article.

Dr. CECIL WALL (physician to London Hospital and Hospital for Consumptives, Brompton) suggested that suspects of tuberculosis should be notified, and the printed form be amended so that by a stroke of the pen the doctor may state whether he suspects, or is certain of, the diagnosis.

Prof. J. ROBERTSON (medical officer of health for Birmingham) said that what he was going to say

about notification had already been said by the men before him, but there were one or two points he would like to emphasise. His own experience was that if proper facilities were given to medical practitioners to enable them to make a diagnosis in difficult cases, there was not much difficulty in notification being properly carried out. He also mentioned the importance of medical students getting more responsible training in the difficult diagnosis of the early case of phthisis; up to the present time adequate training was not sufficient. He advised more observation beds in sanatoriums and the facilities of X ray, &c.

The conference concluded with votes of thanks to the City Authorities, to the Health Committee, and Prof. John Robertson for the excellent arrangements made. A lecture was given in the evening in the large lecture hall of the Birmingham Midland Institute by Sir ROBERT PHILIP, his subject being: The Actual Position of the Tuberculosis Problem To-day. Prof. John Robertson presided. On July 14th various visits to institutions and places of interest were arranged.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

Medical Centre for the Service de la Navigation Aérienne.

THE medical centre for examination and study attached to the Service de la Navigation Aérienne was recently opened at the air-port of Bourget, near Paris, in the presence of Mr. L. Eynac, Under-Secretary for Aeronautics. The Service is civilian, and independent of the medical department of the Military Air Service. Its director is Dr. Paul Garsaux, who is known for his work on the influence of high altitudes on the human organism. Dr. Garsaux gave an outline of the objects of the Service, which is installed in an up-to-date pavilion named after Paul Bert, whose memory is associated with work on atmospheric pressures. The ground floor of the building contains administrative offices, an aid-post, two operating theatres prepared for emergency action, a dispensary, a bacteriological laboratory, a physiological laboratory, and several rooms for examination of pilots. The tests in use will be those laid down according to Annexe E of the Peace Treaty, which deals with the regulation of air navigation. The chief interest of the establishment, however, is the basement, which contains an air-tight compartment, measuring 5 by 3 metres. By means of a turbine engine the air of this compartment can be depleted in order to reproduce the atmospheric condition at any given altitude, and a refrigerating plant is attached which reduces the temperature in proportion to the atmospheric pressure obtained. The whole apparatus is electrically worked, with a system of illuminated safety signals. This unique establishment should enable much useful research work to be carried out.

International Congress for Social Hygiene Propaganda.

An International Congress dealing with social hygiene propaganda and with prophylactic, sanitary, and moral education, was held in Paris at the end of May. The congress was divided into five sections, among the presidents of sections being Profs. Léon Bernard, E. Jeanselme, and Pinard. The general subjects were as follows: (1) The rôle of public institutions for social hygiene; (2) the possibility of the establishment of a schedule of venereal diseases; (3) prophylaxis against venereal diseases in marriage and in the family; (4) sexual education at puberty and in general; (5) Red Cross work. Conspicuous among the communications made to the first section was one by Dr. M. Laignel-Lavastine on prophylactic education against poisons, alimentary (coffee, alcohol, &c.) and non-alimentary (opium, cocaine, &c.). Resolutions were passed by the fourth section to the effect that instruction with regard to the sexual instinct, and the high duties and dangers connected with it, should be given in all primary schools, and to all children of both sexes, according to their ages; that until the onset of puberty instruction should be confined to facts relating to lower animals and to vegetable life; that moral instruction should include consideration of chastity and continence, and of the duty of adults to have children under the best possible social conditions; and that girls should be taught the significance of the secondary sexual characteristics at the time of the appearance of the latter.

Deaths of Drs. O. Josué and J. P. Langlois.

Dr. O Josué, physician to the Hôpital de la Pitié, and vice-president of the Société de Biologie, died suddenly whilst at work in the hospital. He published several works dealing with adrenalinæmia, in which he described the action of adrenalin in the formation of atheromatous lesions, and in the production of aneurysms, and later specialised in the study of cardiac affections.

Dr. J. P. Langlois, professeur agrégé of the Faculté de Médecine de Paris, was professor of hygiene at the Conservatoire des Arts et Métiers, a member of the Académie de Médecine, and one of the leading physiologists of the day. Born in 1862, he became a pupil of Charles Richet, and under his direction, in a thesis for the degree of doctor of medicine, described new research work with the colorimeter, with particular reference to caloric radiation at various times of day. He emphasised the importance of, and in 1887 undertook the study of, the rôles of acute and chronic diseases in the production of heat. In recent years American research work in relation to basal metabolism has confirmed his results, first published in 1896. After study relating to the suprarenal capsules, Langlois carried out research into chlorine equilibrium, holding that the blood maintained this equilibrium even after a hæmorrhage, or after a prolonged chlorine-deficient diet drawing on the chlorine supply of other tissues, notably the muscles. At the same time he worked at the application of physiology to industrial hygiene, particularly in relation to work in warm and humid conditions, and to the physiological effects of nitrous vapour. His long record of valuable service led to his election to the newly constituted chair of physiology applied to physical education.

The Services.

ROYAL NAVAL MEDICAL SERVICE: NEW DIRECTOR-GENERAL.

Surg. Rear-Admiral Joseph Chambers, C.B., C.M.G., has been appointed Director-General of the Medical Department of the Navy in succession to Surg. Vice-Admiral Sir Robert Hill, K.C.B., K.C.M.G., C.V.O., K.H.S., with effect from Oct. 1st next.

ROYAL ARMY MEDICAL CORPS.

Capt. A. F. C. Martyn is restd. to the estabt.

Temp. Capt. W. M. M. Jackson relinquishes the temp. rank of Maj.

Temp. Capt. W. M. M. Jackson relinquishes his commn. and is granted the rank of Maj.

The undermentioned temp. Capts. relinquish their commns., and retain the rank of Capt.: G. B. Proctor and A. R. Leach.

TERRITORIAL ARMY.

Capt. Q. V. B. Wallace, R.A.M.C., to be Divl. Adjt., 42nd (E. Lancs.) Div. and School of Instruction, vice Maj. W. H. O'Riordan, R.A.M.C., vacated.

Capts. J. M. Smellie (late R.A.M.C., Spec. Res.), A. C. Haddow (late R.A.M.C., T.F.), and R. Cûnningham (late R.A.M.C., Mila) to be Capts.

Capt. H. Jacques relinquishes his commn. and retains the rank of Capt.

W. Simpson to be Lt.

Second Lt. W. H. A. Dodd (late R.A.F.) to be Lt.

TERRITORIAL ARMY RESERVE.

Cols. de B. Birch, J. Turton, E. Lee, H. J. Mackay, and J. R. I. Raywood having attained the age limit are retired and retain their rank with permission to wear the prescribed uniform.

Cols. C. E. Harrison and E. C. Freeman having attained the age limit are retired and retain their rank.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following table gives some of the principal health statistics of a group of cities, towns, and urban districts for 1922 :—

Name of town.	Estimated (R.-G.) mid-year population.	Birth-rate.	Death-rates per 1000 of the population.				Death-rates per 1000 births.		
			All causes.	Tuberculosis.	Cancer.	Respiratory with influenza.	Infant mortality.		Maternal mort. in childbirth.
							Legit.	Illegit.	
Carlisle C. ..	53,490	23·6	14·6	1·2	1·2	3·6	77	147	2·4
Worcester C. ..	49,240	19·8	13·5	1·2	1·2	3·2	64	143	2·0
Winchester C. ..	23,750	19·2	11·5	0·5	1·4	1·9	37	48	4·4
Northampton C.B.	92,950	17·7	11·3	1·1	1·2	2·4	51	80	1·8
Torquay B. ..	33,690	14·5	17·5	1·8	1·8	3·2	38	121	6·1
Heston and Isleworth U.D. ..	46,330	18·7	11·8	1·0	1·0	2·1	70	226	4·4
Hendon U.D. ..	55,930	17·4	8·8	0·6	1·2	1·7	42	98	2·0
Ilford U.D. ..	86,370	17·8	9·5	0·6	1·0	1·7	52	135	4·0
Spenborough U.D.	31,670	16·3	12·6	0·8	1·3	2·6	90	266	12·0
Swinton and Pendlebury U.D.	31,780	19·0	11·0	0·8	1·1	3·2	74	143	5·0
Tottenham U.D.	150,500	21·0	11·3	1·0	1·1	2·6	—	—	1·6
Willesden U.D. .	168,900	18·7	10·6	0·9	1·0	2·3	54	245	3·2

C.=City. C.B.=County borough. B.=Borough.
U.D.=Urban district.

Carlisle.

Dr. Joseph Beard reports that Carlisle, like many other towns, suffered from an influenza epidemic during the first quarter and that 55 deaths of residents were registered from this cause. The maternity hospital admitted 183 cases as against 144 in 1921. The number of women resorting to artificial feeding during the time of the midwife's attendance is less, but Dr. Beard thinks artificial feeding is much too frequent, considering the small number of married women industrially employed. One-third of the 180 new expectant mothers attending the ante-natal clinic had definite abnormalities needing attention. The number of stillbirths notified was 66, equal to 5 per cent. of the live births. There were 6 infantile deaths due to accident, and in 4 of these accidental smothering was the cause given. Definite action is being taken to compel owners to carry out war arrears of repairs.

Worcester.

Dr. Mabyn Read reports that housing shortage is still urgent. The overcrowding is often bad, but to take action would have been in most cases a cruel act. Dr. Read is afraid that in the years to come there will be an increase of tuberculosis, owing to lessened resistance, caused by overcrowding, want of sunlight in the homes, insufficient food, and anxiety due to unemployment. The "appeal to the cow" was utilised in most of the successful milk prosecutions. Dr. Read regrets the reluctance of women to seek treatment at the V.D. clinic for gonorrhœa. The need for a maternity home is felt. Half the infant deaths occur in the first month, showing the need for ante-natal work. From 13 to 14 expectant mothers in the last three months of pregnancy and nursing mothers were provided with dinners daily at a cost of 1*s.* 3*d.* and subsequently 1*s.* per dinner, with good effect. Dr. Marion Andrews comments favourably on the fact that midwives sent for a doctor in about 20 per cent. of their cases.

Winchester.

Dr. W. A. Bruce Young reports that the rapid completion of a large number of houses at Stanmore is having an appreciable effect on overcrowding, which is, however, still considerable. The large amount of unemployment has called for a corresponding supply of extra milk for mothers and babies and will probably call for still more next winter. The outstanding needs of the schools are: (1) A school dental service; (2) medical inspection for secondary schools; (3) playground classes or an open-air school; (4) a special school for backward children and higher-grade mental defectives.

Northampton.

Dr. J. Doig McCrindle pays a tribute to the foresight of the water engineer in saving the town from a water shortage; a temporary supply from the river was chlorinated and rendered safe. The use of this supply was discontinued in August, 1922. Although the corporation have been active in providing new houses, 224 municipal houses having been completed during 1922, the result was not much in evidence in the relief of overcrowding. Action with regard to an unhealthy area, comprising 67 houses with a population of 314, reported by Dr. McCrindle, has been postponed. Most of the milk prosecutions were dismissed, and Dr. McCrindle thinks that the "Hunt *v.* Richardson" case and the "absurd" circular letter of the Ministry of Health of July 17th, 1922, have rendered futile attempts to deal with milk found not to be genuine. Elementary, private, and Sunday schools were closed for a time at the end of January owing to the influenza epidemic. The ante-natal work has progressed, and Dr. McCrindle can point to a decline in neo-natal mortality as compared with the previous decade.

Torquay.

Dr. Thomas Dunlop points out with reference to the high death-rate from cancer that the population includes a large number of old people. The general death-rate of 17·5 becomes 15·3 when corrected for age and sex. There is no maternity home and ante-natal work is hardly begun. Dr. Dunlop regrets that the proposal to have a V.D. centre fell through on financial grounds. The building of bungalows in areas which cannot be sewered owing to the levels is commented on. A local Bill now before Parliament includes provisions likely to prove useful—e.g., powers to establish a public abattoir, to prevent an advanced consumptive from handling food, to require persons dealing in shell-fish to furnish the source of supply, &c. A committee has been formed to create a demand for Grade A milk, and deputations have been to Reading to study methods. Owing to housing shortage, an insanitary area cannot be dealt with, and it is difficult to get repairs carried out.

Heston and Isleworth.

Dr. Elwin H. T. Nash reports that there are 41 private wells in his district, from which water is used for domestic purposes. During the year 117 taps from the main, in lieu of taps from inaccessible and uncovered cisterns, were provided in compliance with notices. An interesting account is given of the outbreak of lead poisoning associated with beer containers lined with a lead-containing enamel. Dr. Nash and all those concerned, including the brewery company, are to be congratulated on the prompt manner in which the matter was dealt with and the containers removed. During the autumn the hospital was overtaxed and the Milne treatment was adopted with success for home-treated cases of scarlet fever. A midwife was reported for delay in complying with the regulations in a case of ophthalmia neonatorum. The child in question is completely blind and Dr. Nash is amazed that the Central Midwives Board have merely placed the midwife on three and six months' probationary service. Ante-natal work is negligible and baby-welfare work difficult owing to unsuitability of premises, and there is no dental clinic for mothers and little children. Housing conditions remain unsatisfactory and overcrowding cannot be dealt with. Dr.

Nash is strongly opposed to wholesale removal of enlarged tonsils, as he finds that a considerable number disappear after a septic mouth has been cleaned up. He also advocates complete enucleation and does not believe in the removal of a mere slice. There is need for an open-air school.

Hendon.

Dr. T. S. McIntosh points out one disadvantage of the substitution of gas-fires for coal—viz., the increase in house refuse. The Hendon Council have decided to build a new hospital in lieu of the temporary one which has been in use for 30 years. Dr. McIntosh reports that there is some difficulty in getting defects of the teeth and vision treated in the schools.

Ilford.

Dr. A. H. G. Burton submits a very complete report on the health administration and school medical service of Ilford. The percentage of children found by the school nurses with verminous heads has been reduced from 10 per cent. in 1920 to 5 per cent. in 1922. The work of Mr. R. S. Charsley, the school oculist, is being more appreciated, and he succeeded in treating 90 per cent. of the discovered cases of defective vision. The school dentist is faced by a formidable task, as 62 per cent. of the children examined by him needed treatment, and, although less than half of these were brought by the parents for treatment, the number actually treated exceeded 2000. Satisfactory arrangements have now been made with neighbouring districts for the accommodation of small-pox patients at the Orsett Joint Hospital in the first instance, with the West Ham Council's hospital at Dagenham in reserve.

Spenborough.

The chief event recorded by Dr. Lawrence Pick is the opening of the new health offices with a school clinic and maternity and child welfare centre. Dr. Pick, however, expresses his regret at the continued refusal of the Board of Education to sanction a dental service or the treatment of ringworm by X rays. Of 1076 routine-inspected children 50 were noted as being poorly nourished, a larger percentage than in 1920.

Swinton and Pendlebury.

Dr. H. C. Mulholland points to the need of hospital treatment for measles, pneumonia, and infantile diseases which cannot be nursed in an overcrowded home. He thinks there is an increased interest in public health matters and hopes this may lead to a demand for cleaner milk, cleaner handling of food, and the abolition of the smoke nuisance. The attendances at the antenatal clinic, conducted by Dr. C. G. Magee, continue to increase, and the results of the work are said to be very encouraging. As an illustration of the need for more houses, it is mentioned that of 561 newly-born infants visited 16 per cent. were born in a house already overcrowded, and 40 per cent. were born in a house occupied by two or more families.

Tottenham.

Dr. David C. Kirkhope reports that the houses completed by his council and the London County Council have not alleviated the housing difficulty to any appreciable extent. The culverting of the brook on the Tewkesbury estate is in progress and is the first really effective step towards making the adjacent properties sanitary. Dr. Kirkhope condemns Circular 325 of the Ministry with regard to milk prosecutions, which had not been withdrawn when his report was issued in March, 1923. Dr. Kirkhope also regrets that the scheme for coördinating the work of all the health nurses employed by the Tottenham Council gives no appearance of coming to fruition. The work of the school medical service continues to grow. The sessions at the minor ailments clinic have had to be increased. A second dentist began work in May. A satisfactory arrangement has been made with the National Hospital for Diseases of the Heart for examination of special cases of heart disease. The large number of children suffering from chronic otorrhœa and in attendance at the minor ailments clinic is disquieting, and a "sure, safe, and simple remedy for the malady is urgently needed."

Willesden.

Dr. George F. Buchan shows the effect of the imposition of the 2*s.* 6*d.* registration fee for attendance at the municipal clinics. The attendances of mothers and "under 5" children fell by 42 per cent. for the first quarter and by 34 per cent. for the full year. There was a similar decline in the attendance of school-children which mostly, at any rate, disappeared on the withdrawal of the registration fee for school-children on July 10th, 1922. Dr. Buchan has to record considerable damage from ophthalmia neonatorum. Of 38 cases, 31 made a complete recovery and two were under treatment at the end of the year. Of the remaining five, three had one eye and two both eyes permanently injured. In the schools treatment was secured for 96·8 per cent. of medical defects and 59·1 per cent. of dental defects. Dr. Buchan again reports that the accommodation at the schools for physically defective children is far from ideal and that, until the ambulance service is improved, full use of the accommodation provided for both physical and mental defectives cannot be made. Housing conditions are unsatisfactory and repairs are not carried out in the workmanlike manner of pre-war days. The manner of feeding the school-children of the South Kilburn area is reported on adversely. The table appointments are still one spoon and the dietary lacks variety. The earlier arrivals scramble through to make room for others, destroying all possibility of order.

Dr. W. J. J. Stewart, the superintendent of the municipal hospital, points out that although scarlet fever is of a mild type, complications show no marked tendency to diminish. Diphtheria, he says, has become more fatal in recent years. Dr. Stewart regrets greatly that the orthopædic clinic for children of pre-school and school age, which has done much good work, will have to be abandoned as the hospital is no longer open to such cases, and the benefit done by this specialised treatment during the last three years will, to a great extent, be undone. A smaller number of maternity cases was admitted, 305 as compared with 407 in 1921. There was no case of a septic nature, no patient contracted an infectious disease, and the only maternal death was that of a woman suffering from advanced tuberculosis. Of the 286 infants born, 8 died from prematurity and 17 were stillborn. Dr. Stewart reports a great increase in the sickness rate of the domestic staff since the arrangement was adopted by which the domestic staff may live outside the hospital.

Obituary.

WILLIAM FORD ROBERTSON, M.D., C.M. EDIN.,

PATHOLOGIST TO THE SCOTTISH ASYLUMS.

Dr. William Ford Robertson, who died on July 17th at the age of 56, was a native of Roxburghshire and received his early education at Daniel Stewart's College and at George Watson's College, Edinburgh. He afterwards joined Edinburgh University, where he graduated M.B., C.M. in 1891, and proceeded to the M.D. degree four years later. He was resident physician to the Royal Infirmary and to the Royal Hospital for Sick Children, Edinburgh, as well as pathologist to the Royal Edinburgh Asylum from 1893 to 1897, when he became pathologist to the Scottish Asylums, a position which he held till the time of his death. The application of modern pathology to mental conditions was a subject which greatly attracted him, and in 1900 he published the result of his studies in a "Text-book of Pathology in Relation to Mental Diseases," which proved an interesting addition to the library of those engaged in similar work, though in some respects, owing to a desire to put forward constructional views as early as possible, it was lacking in completeness. It was not till 21 years later that he published his well-known

book on Therapeutic Immunisation in Asylum and General Practice, a work which advanced views in many directions controversial, but which at the same time gave much food for thought. He was ever distressed at the difficulty of preventing mental disease in our present state of knowledge, and his book is a valiant attempt to solve this problem. It covers ground which has still to be tested, and, indeed, Dr. Robertson admitted that "numerous facts new to science are recorded and many heterodox opinions are expressed which are not likely to be accepted without a fight." It was Dr. Ford Robertson who translated Tanzi's "Text-book of Mental Diseases," one of the best presentations of the science of psychiatry of its date (1909). He will be remembered as one of those who strove constantly to correlate mental and physical disease and who succeeded at any rate in stimulating others to further research on these lines.

Correspondence.

"Audi alteram partem."

LYMPHOCYTOSIS FROM INFECTIONS.

To the Editor of THE LANCET.

SIR,—Dr. Gordon Ward thinks that we have dismissed too unceremoniously the evidence that sepsis may produce an absolute lymphocytosis. Dr. Ward mentions a case of Cabot's. This is a case which is almost invariably referred to when this question is dealt with in text-books or elsewhere. May I ask Dr. Ward to read again Cabot's original article? The account is very brief, about 20 lines, and is apparently a statement from memory of the clinical condition and blood changes in a patient seen 15 years previously. I do not think that it is of any great value as evidence. In the various articles on lymphocytosis in sepsis and infections, the cases which cannot be recognised either as leukæmia or glandular fever are of similar type—that is, they are cases so insufficiently reported that no opinion can be expressed upon them. It is noteworthy that the great war, so far as I know, failed to produce a single reported instance in any country in which absolute lymphocytosis can be justly ascribed to sepsis. A blood count of 20,000 white cells per c.mm. with 60 per cent. of lymphocytes would be accepted by all as a definite lymphocytosis. In leukæmia these are every day figures, and many instances could be found in whooping-cough and in cases recognisable as glandular fever or infective mononucleosis. Can medical literature produce six definite cases where such figures have occurred in conditions usually regarded as sepsis? One would be justified in rejecting as insufficient such examples as a streptococcus isolated from the fauces in a condition otherwise typical of leukæmia, and also many of the slighter grades of lymphocytosis. I have not found such cases in the literature, and I have not met them in my own experience. It was on these grounds therefore that we made the statement that there is no evidence that sepsis is a cause of absolute lymphocytosis. The production of such cases would obviously alter the position, and it is possible that Dr. Ward may be able to supply them from the great collection of the literature of hæmatology which I know that he possesses.

I am, Sir, yours faithfully,

H. LETHEBY TIDY.

Devonshire-place, W., July 21st, 1923.

SCHISTOSOMUM MANSONI IN SOUTH AFRICA.

To the Editor of THE LANCET.

SIR,—Natives working on the mines along the reef are occasionally found to be harbouring *Schistosomum mansoni*; but these are generally believed to have acquired the condition in Portuguese East Africa, and no instance is on record where the disease has been contracted in the Transvaal. In 1920 Dr. E. C. Faust reported the presence of this parasite in some fresh-water snails I had sent him from Natal, and the observation was confirmed by Dr. Annie Porter.

In June, 1921, I was apparently successful in eradicating this parasite from a coloured boy of 13, who had acquired the infection through swimming in the brickfields outside Durban in 1920. The usual signs of degeneration were observed in both lateral and terminal-spined ova obtained from the urine during a course of intramuscular injections of *emetine*.

This would appear to be the first case where *S. mansoni* has been recorded in a patient who has never left South Africa, and the infection was a slight one, giving rise to no symptoms other than those generally associated with early infestation with *S. hæmatobium* although the lateral-spined ovum was obtained both from the urine and a rectal wash.

Although well known at Kingwilliamstown in the Cape, it was thought that bilharzia disease did not occur in Natal rivers south of Durban, and that the Amanzimtoti river, which is, perhaps, the most popular place for Durban picnic parties, was certainly free from infection. However, I have collected examples of *Physopsis africana*, *Limnæa natalensis*, *and Isidora forskali* from this river, and have treated patients who have become infected with *S. hæmatobium* through bathing in several rivers along the south coast of Natal.

On June 15th, 1923, I commenced to treat a native, aged 15, who had suffered from constant hæmaturia since bathing in the Umtalumi river near Umzinto. During the last two years he has lived at a mission station near the source of the Amanzimtoti river. I have already drawn attention to the undesirability of allowing bilharzia carriers to attend schools along the course of rivers infested with the intermediary hosts of the bilharzias. Microscopic examination of the centrifugalised urine of this native showed numerous spine-pointed ova and a few lateral-spined ones. These rapidly disappeared, after showing the usual degenerative changes, under intravenous injections of *tartar emetic*, the potassium salt being used throughout. No ova were seen in a rectal wash on June 26th; but, by that time, the ova had almost entirely disappeared from the urine. In this healthy-looking native the only symptom noted was the chronic hæmaturia, which was apparently due to the escape of the numerous spine-pointed ova.

Both *S. hæmatobium* and *S. mansoni* infestation can be acquired at the Natal coast. It is impossible to say whether the latter has been introduced into the Union as a result of untreated cases returning from Egypt; but, as the introduction of a new disease is often associated with severe symptoms, these slight manifestations of *S. mansoni* infestation in young persons suggests that they are sporadic cases alone.

Nevertheless, the presence of intermediary hosts of this parasite in all the Natal rivers indicates the importance of diagnosing and treating this condition before it is allowed to spread further in the Union.

I am, Sir, yours faithfully,

F. G. CAWSTON, M.D. Camb.

Durban, Natal, June 30th, 1923.

LANCASHIRE INSURANCE COMMITTEE AND THE SPAHLINGER TREATMENT.—On July 18th a deputation from the Lancashire Insurance Committee went to the Health Ministry to ask permission to make a grant of £100,000 towards financing M. Spahlinger's Institute at Geneva, so that the Spahlinger serum may be available for insured persons in the county. On a previous occasion a similar proposition to the Ministry led to no definite result. The deputation proposed to make use of the power given to insurance committees under Section 21 of the Act of 1911, to spend such funds through some approved charitable institution. The intention is to set up such an institution at Eastbourne, to which the Spahlinger products would be sent from Geneva for the treatment of patients from Lancashire. Dr. Thomas Watts, M.P., who accompanied the deputation, called attention to the high percentage of cases treated with these remedies which had derived permanent benefit. The deputation was asked to provide further proof that the proposed Eastbourne institution will be a "charitable institution" in a legal sense, and the furnishing of such evidence is now under consideration.

INSULIN.[1]

BY J. J. R. MACLEOD, F.R.S., M.B., CH.B. ABERD.,
PROFESSOR OF PHYSIOLOGY IN THE UNIVERSITY OF TORONTO.

[Prof. Macleod gave an historical survey of the mass of work published on the relationship between the pancreas and disturbances in carbohydrate metabolism, from that of Brunner in the seventeenth century up to the time when convincing evidence that an antidiabetic hormone does actually exist in the pancreas was furnished by Banting and Best, their experiments being of a different type from those of their predecessors. He continued:—]

It now became apparent that attempts should be made to see whether the crude alcoholic extracts of ox pancreas could be sufficiently freed from those substances which made them unsuitable for subcutaneous administration to diabetic patients, either because of local irritation or general toxic effects. At this stage of the investigation we were joined by J. B. Collip, who, in a remarkably short period of time, succeeded in isolating from the alcoholic extracts, by fractional precipitation with alcohol, a precipitate which contained the antidiabetic hormone in high concentration, and which, in watery solution, could be injected subcutaneously in man without any deleterious effects. At the same time it was also discovered that the blood-sugar is lowered in normal rabbits by subcutaneous injection of extracts containing the antidiabetic hormone, and to this observation was due in large part the rapid progress which it was possible to make in the isolation of insulin. It offered a ready means for testing the relative potency of the various precipitates and filtrates, and of determining the most favourable conditions under which extraction of the gland should be carried out.

Provided with a comparatively simple method for the preparation of insulin, it now became possible to undertake a systematic investigation of its physiological and chemical properties and its possible therapeutic value, and I shall endeavour to describe briefly what has been found, and to indicate, in a general way, what appear to be the most hopeful lines for further research. It seemed advisable at this stage to group the problems demanding immediate investigation, and this was done as follows: 1. The effect of insulin on the respiratory exchange, the distribution of glycogen, and the metabolism of fat in animals rendered diabetic by pancreatectomy. 2. Its therapeutic effect in diabetes mellitus. 3. Its effect on the blood-sugar of normal animals and the symptoms which result from overdosage. 4. Its pharmacological assay. 5. Its effect on the blood-sugar in the various forms of experimental hyperglycæmia. 6. The physiological mechanism by which it lowers the blood-sugar. 7. Its source. 8. Its chemical reactions and its preparation on a large scale. In planning for the investigations of these problems we were in the fortunate position of having the whole-hearted collaboration of several trained workers, not only in my own department (E. C. Noble, J. Hepburn, and J. K. Latchford), but also in that of internal medicine under the direction of Prof. Duncan Graham (W. R. Campbell and A. A. Fletcher).

The Effect of Insulin on the Metabolism of Carbohydrates and Fats in Experimental Pancreatic Diabetes.

From the time carbohydrates are absorbed, mainly as glucose, into the blood of the portal circulation until they are completely oxidised, changes in chemical structure are constantly occurring. These consist, partly, in a condensation of several glucose molecules to form glycogen, and partly in a splitting of the molecule, proceeding through various intermediate stages. The intermediary substances formed at each stage are doubtless in a certain state of equilibrium, one with another. Many of them do not accumulate sufficiently to be detectable by chemical means, being changed into the next stage almost as quickly as they are produced, and at the present time we are limited, in our attempts to follow the various steps in the process, to observations on the concentration of glucose in the blood, the amount of glycogen deposited in the tissues, and the type of combustion occurring in the organism as a whole. In diabetes marked and significant alterations occur in each of these; the blood-sugar rises to a high level, glycogen practically disappears from the liver and becomes decreased in the muscles—except the heart, in which it increases—and the nature of the combustion process, as revealed by the behaviour of the respiratory quotient, becomes changed so as to indicate that no carbohydrate is being oxidised. It is safe to assume that the increase in blood-sugar is secondary to the other changes, but it is difficult in the present state of knowledge to understand the relationship. It has been a favourite hypothesis that the primary fault in diabetes is in the oxidation of glucose, or in the chemical changes which precede this, and that this leads to the drafting to the tissues from the glycogen reserves of a plethora of sugar; a sort of forced-feeding process, as it were. Another hypothesis is that the glucose molecule must become altered in some way before it can be either oxidised or condensed into glycogen, and that this alteration does not occur in diabetes. Through the work of Irvine and his school much light has been thrown in recent years on the structure of the sugar molecule, and it has been shown that besides the well-known α and β varieties of glucose, in which the oxygen linkage is between the first and fourth carbon atoms, there is also a third variety, called γ glucose, in which the oxygen ring is displaced from the normal stable position. The detection of the γ sugars depends mainly on a comparison of the reducing and polarising powers of the solutions, and, by using this method, Winter and Smith have recently published results which they interpret as showing that the alteration in the glucose molecule alluded to above is the production of γ glucose. γ glucose, according to this view, is a necessary preliminary stage in the oxidation of glucose, and, if we suppose that it is also so for its condensation into glycogen, the inter-relationship of the three changes found in diabetes becomes immediately intelligible.

I have dwelt on these theoretical considerations because of their great interest in connexion with the mechanism of the action of insulin. For it is a significant fact that this hormone, when administered to depancreated animals, completely restores to normal each of the three functions. We have repeatedly found, for example, when it is given along with carbohydrate to depancreated dogs, that very large quantities of glycogen become deposited in the liver and that the respiratory quotient becomes raised in the same manner as it does in normal animals with carbohydrate alone. We know also from the work of Banting and Best on depancreated dogs that it reduces the blood-sugar to the physiological level, that the glycosuria disappears, and that the well-being of the animal becomes normal in every regard.

We must conclude, therefore, that insulin is necessary for the metabolism of carbohydrate, and we may suppose that its function is in some way related to the preparation of the glucose molecule for combustion and condensation. But as to whether this preparation consists in a change of α, β glucose into the γ variety cannot as yet be considered as settled. Dr. G. S. Eadie has repeated Winter and Smith's observations, and by strictly following their instructions has obtained similar results. Briefly stated, these results are that after removal of the proteins by phosphotungstic acid and alcohol from normal blood, the dextrorotary power of the filtrate is lower than it should be as calculated from the reducing power, and on standing 24 hours the differences become less, and later they practically disappear. On the other hand, when blood from diabetic patients or hyperglycæmic animals is used, the dextrorotary and reducing values

[1] A lecture (abridged) delivered before the Eleventh International Congress of Physiology at Edinburgh on July 24th.

correspond from the start, or the former may exceed the latter. Administration of insulin causes the diabetic blood to behave in these regards like normal.

The question is with regard to the interpretation of the results, and, as Hewlett has pointed out, this need not necessarily be that γ glucose is present, but rather that chemical changes have occurred in the very complicated procedure which is involved in the preparation of the solutions for the polariscope. Others have believed that the blood may contain, besides glucose, other carbohydrates or related substances having a relatively low dextrorotary power. Since this question is not yet settled I need not dwell on the further claim of Winter and Smith that insulin is capable of causing γ glucose to be formed when added to a solution of ordinary glucose along with an extract of liver. I may state, however, that we have so far been unable to confirm this result.

The action of insulin on the metabolism of fat in diabetic animals is equally as striking as it is on that of carbohydrates, and here again its effects are revealed by chemical changes occurring at both ends as it were of the metabolic chain. In a few days after pancreatectomy in the dog, the blood and the liver contain excessive quantities of fat, although the extreme degrees of lipæmia sometimes encountered in diabetic patients have not been observed. There is also a certain degree of acetonuria, although again this is much less pronounced than it is in diabetes in man. Evidently the migration of fat in the body is abnormal, and its final oxidation seriously interfered with. When insulin is given along with carbohydrates to these animals, the acetonuria very promptly disappears, the blood fat, apparently more slowly, returns to normal, and the liver in a few days contains no more fat than that of a normal, similarly fed animal. As the glycogen increases in this viscus the fat correspondingly declines. We cannot state at which stage in the metabolism of fats insulin exercises its corrective influence, but wherever this may be, there can be little doubt that it acts indirectly because of its effect on carbohydrates. It has been said that fat burns in the fire of carbohydrates, and although this generalisation may, in some respects, be misleading it is, nevertheless, a useful one to guide us in interpreting the results with insulin.

The Therapeutic Effects of Insulin in Diabetic Mellitus.

As would be expected, the effects of insulin on patients suffering from diabetes mellitus, in so far as these have been studied, are of the same general nature as those observed on diabetic (depancreated) dogs. Until the laboratory investigations had furnished perfectly definite results no serious attempts were made to carry the investigations into the clinic, nor would it have been permissible to do so in view of the failures of previous workers to provide an extract that did not cause toxic symptoms. Without animal experimentation we would be no further to-day in the treatment of diabetes, and in the undoubted saving of human life which has been the result, than we were a little over a year ago when the treatment was first applied on any considerable scale.

In studying the results obtained by administration of insulin on patients, we must bear in mind, however, that two factors may come into play that are not involved in the experiments on completely depancreated animals. One of these is dependent on the fact that there probably still remains in the majority of diabetic patients a certain remnant of pancreatic tissue capable of secreting insulin; and the other, on certain differences between laboratory animals and man, related in part to peculiarities in the type of metabolism and in part to the greater development of the nervous system, and to which the frequent occurrence of coma as a serious symptom of the clinical form of the disease is due. Moreover, we must remember that subjective phenomena can be studied only on man.

The first case in which a complete study of the therapeutic value of insulin was made was that of a boy of 14 years of age, exhibiting all the classical symptoms of the disease, and on whom treatment by dietetic control had resulted in no improvement. Daily injections of insulin between Jan. 23rd and Feb. 4th, 1922, reduced the blood-sugar even to the normal level, greatly diminished the glycosuria, and often caused it to disappear, removed entirely the ketonuria for a period of some days, and, perhaps most striking of all, "the boy became brighter, more active, looked better, and said he felt stronger." There could be no doubt as to the great therapeutic value of the treatment, when judged both by the improvement in the objective and subjective symptoms of the disease. This, along with other cases treated by insulin, and reported by Banting, Best, Collip, Campbell, and Fletcher, is only the first of a large number, exhibiting the disease in all its forms, that have been most carefully studied in numerous clinics both in Canada and the United States and in this country, and I cannot refrain from expressing my admiration for the excellent spirit of collaboration which has made this possible. I am not qualified, nor even if I were would it be in place for me here to discuss further the clinical results, but I may say that there can be no doubt that insulin is capable, when wisely used under controlled conditions, of saving many cases of diabetes which would otherwise inevitably have succumbed to coma, or to one of the many other complications of the disease. It is also certain that, as an adjunct to dietetic control, treatment with insulin greatly improves the nutritive condition and increases the resistance towards infections, thereby prolonging the expectation of life. The subjective condition and the sense of well-being of the patients are also vastly improved. As to whether continued treatment with insulin will enable the diabetic patient to recover any of his lost power of producing this internal secretion in his own pancreas, nothing definite can be said at present. It is at least significant in this connexion that the islet tissue develops considerable powers of regeneration after much of it has been destroyed as a result of ligation of the secreting ducts of the pancreas, as has been shown by R. R. Bensley to be the case, at least in the rabbit and guinea-pig. Arising as it does in these cases from outgrowths of the duct epithelium, may it not be possible in man, in whom the pancreas has not been completely destroyed by disease, that new islet tissue will become regenerated when, by administration of insulin, the strain to produce this hormone endogenously is removed?

Returning now to the more purely physiological aspects of the subject, let me briefly lay before you what is known regarding the effects of insulin on normal animals. In the consideration of these results we must bear in mind that the conditions in the normal animal are fundamentally different from those obtaining in the diabetic. In the normal animal there is probably available at all times a sufficient amount of insulin for every purpose for which it is required, so that the addition of more from without upsets the metabolic balance and thereby induces an abnormal state. In the diabetic, on the other hand, the injection of insulin only restores to the body a hitherto missing part of the metabolic machinery and enables it to run smoothly again.

The Effect of Insulin on the Blood-sugar of Normal Animals.

Within a few minutes of the intravenous or subcutaneous injection of a moderate dose of insulin, the percentage of sugar in the blood begins to fall, and it continues to do so more or less in a straight line for a period which varies from about one half-hour to several hours, according to the animal, after which the curve may gradually become less steep or it may begin to rise again.

The prompt onset and the steep nature of the fall in blood-sugar are characteristic features of the action of insulin, and are quite unlike the hypoglycæmic effects that may be produced by administration of other substances, such as phosphorus or the

insulin-like materials that have been prepared by Collip and others from clams and from various vegetable sources. Indeed, the character of initial fall is such as to give the impression that the process responsible for it must be one operating within the blood itself—an intravascular glycolysis. But this cannot be the case, since we have been unable to find that the addition of insulin to defibrinated blood kept under sterile conditions at body temperature outside the body has any influence on the rate at which sugar disappears; neither is there any difference in this regard between the blood of normal animals and that of animals injected with insulin at varying periods preceding the withdrawal of the blood. Evidently, therefore, the locus of action of insulin is extra-vascular; it is in the tissue cells. We must conclude that the insulin sets up some process by which, as it were, a vacuum for sugar becomes established in these cells, so that sugar is removed from the blood. One may imagine that in the tissues there exists a certain balance between the concentration of free glucose, the complex carbohydrates from which it may be derived, and the various derivatives into which it breaks down prior to its oxidation. In other words, one may speak of a certain tension of glucose as being necessary in the tissues and consider the action of insulin as having the effect of reducing this tension so that glucose diffuses into them from the blood in order to maintain it.

After about one half-hour the blood-sugar in the rabbit usually begins to rise again, or at least the fall to become much less pronounced, indicating that the effect of insulin is becoming neutralised by the liberation of sufficient glucose from the glycogen stores of the muscles and liver. This, of course, means that the hypoglycæmia following insulin will be much more prolonged and will ultimately become much more pronounced in animals provided with small reserves of glycogen than in those that are rich in glycogen. Such can readily be shown to be the case, and it is significant that a well-fed animal may withstand many times the dose of insulin that would prove fatal to one that was starved.

It is customary to imagine that the glycogenic mechanism of the liver is so finely attuned to respond to the concentration of sugar in the blood that glycogenolysis immediately sets in when this falls below the normal level. That such is not the case following insulin may depend on the fact that the glycogen, which is first of all called upon to maintain the glucose tension in the tissues, is that of the muscles themselves; but we will not here venture further into the various interesting consequences of such an hypothesis. It is at least significant that the glycogen of the muscles, as well as of the liver, is usually reduced in animals that have been given large doses of insulin (McCormack and O'Brien and Dale and Dudley). On account of its practical significance it should be pointed out that it is because of the poverty of the glycogen reserves that the blood-sugar of diabetic patients treated with insulin is more apt to fall suddenly to a dangerously low level than is that of normal persons.

The Hypoglycæmic Symptoms.

When the percentage of blood-sugar has fallen to about 0·045 curious symptoms supervene. These were first observed in rabbits, and in a typical case consist in a violent convulsive seizure in which the animal throws itself over sideways, usually first in one direction, then in the other, with the head retracted and the hind limbs in an extended position. The condition is not unlike that caused by strychnine or by acute asphyxia, except that certain groups of muscles are less affected by the convulsions than others. After a period, usually of from 30 seconds to a minute, the convulsions cease and the animal lies on its side in an unconscious state, perhaps showing running-like movements of the extremities, and with rapid, shallow breathing. The exact condition of the animal at this stage may, however, vary considerably, well-fed and therefore glycogen-rich animals often sitting in apparently normal fashion between the convulsive seizures, which are often brought on by attempts to move. After a varying period the comatose stage is followed by another convulsive seizure, and these phases may continue alternately for an hour or more, the convulsions becoming feebler and feebler and the rectal temperature falling, until at last the animal dies of respiratory failure. After death rigor mortis sets in at once. The arterial blood is venous in colour, and it clots very quickly. Preceding the onset of typical convulsions there are usually premonitory symptoms of hyperexcitability and evidence of hunger; sometimes, however, paralysis of the extremities is the first symptom.

The symptoms vary somewhat in other animals. In the dog the first signs are usually very rapid breathing, restlessness, and general hypersensitivity, muscular twitching then becomes evident and the sphincters may relax. Barking is often a prominent symptom, and there may be frothing at the mouth. At this stage, or as the first symptom, convulsions not unlike those seen in the rabbit may supervene, and between them the animal lies on its side, showing violent twitching of the musculature, almost a tetany. It is evidently unconscious. The rates of breathing and of the pulse increase. Inspiration is usually short and jerky, and inspiratory tetanus not infrequent, so that artificial respiration may have to be applied. Attempts to get on its feet are often the cause for convulsive seizures and, during recovery, the muscles of the extremities, particularly the anterior, are seen to have entirely lost their power of coördinate action. In etherised dogs even massive doses of insulin have no immediate effect on the blood pressure.

In the cat the symptoms are like those in the dog, profuse salivation, mewing, and relaxation of the sphincters being especially marked.

In the mouse kept at room temperature, A. Krogh observed that insulin may only cause the animal to become weak, but its temperature falls to a very low level. If it be kept in an incubator at about 28° C., however, characteristic symptoms supervene—convulsions and coma, preceded by paralysis of the legs—with doses of insulin, which, when compared on a body-weight basis, are only about one-fifth that necessary for rabbits.

This influence of body temperature is particularly interesting, since it probably explains the apparent immunity of frogs even to massive doses of insulin. We failed to note any symptoms even in three days after injecting insulin, but A. Krogh has since found that they occur in a day or so later, a fact which we have confirmed.

In man, in whom the subjective symptoms can be interpreted and cardio-vascular changes more accurately observed, the picture is different. When the blood-sugar reaches about 0·075 per cent. the patient experiences extreme hunger and a sense of fatigue. He usually becomes anxious and may lose his emotional control. Actual tremor of the musculature is rarely seen, but there is a definite sense of tremulousness and some incoördination for fine movements. "Vasomotor phenomena are common; pallor or flushing, sometimes one after the other; a sense of heat, of chilliness, almost always a profuse sweat" (Banting, Campbell, and Fletcher). At lower levels of blood-sugar, acute mental distress, mental disturbances, delirium, and finally coma, with loss of the deep reflexes supervene.

The correspondence between the onset of definite objective symptoms and a blood-sugar percentage of 0·045 in laboratory animals is remarkable. Sometimes, as in starved animals receiving a large dose of insulin, the blood-sugar may be found to be considerably below this level when convulsions first appear. Very occasionally it is decidedly higher, and immediately after a convulsion the sugar may rise somewhat. These facts suggest that the symptoms are the result of the lowering of the tension of glucose in the tissue cells below a certain critical level—a condition of "glucatonia," we may call it—and to which the hypoglycæmia runs parallel. This view is supported

by the striking manner in which the symptoms are almost instantly removed by administration of glucose, and it is of great significance that other hexose monosaccharides have only a slightly beneficial effect, although, of course, their injection causes a marked rise in the reducing power of the blood. Mannose and lævulose seem to be somewhat more efficient than galactose. None of the pentoses or disaccharides has any effect. Injection of epinephrin, subcutaneously, also removes the symptoms, no doubt because it excites the production of glucose out of the glycogen reserves. It is of use, therefore, only when the reserves are considerable, and it should not be depended upon for antidoting the symptoms of glucatonia in diabetic patients, because in them the glycogen stores are apt to be low. A similar relationship between the percentage of blood-sugar and convulsive symptoms had previously been described by Mann and Magath in dogs deprived of the liver: administration of glucose also removed the symptoms, other monosaccharides having only a slight effect.

There can be little doubt, then, that the symptoms are related to a lowering of the glucose tension in the tissues. But we cannot imagine that this, in itself, is responsible for the violent stimulation of the respiratory and muscular centres that evidently occurs. Some unphysiological condition must become developed as a result of the glucatonia, and it has been suggested that anoxæmia may be an important factor. Olmsted and Logan point out that there is a remarkable resemblance between an insulin convulsion and an asphyxial convulsion, and that the arterial blood is invariably intensely venous in colour when convulsions supervene. "It may possibly be that through the lowering of blood-sugar certain oxidative processes become depressed to such a degree that the brain cells are affected in much the same manner as in asphyxia."

Whatever may be the nature of the toxic condition, it is clearly on the cells of the pons and medulla that it acts. It does not, like strychnine, act on the motor centres of the spinal cord, since insulin causes no convulsive symptoms in a decapitate cat, although it may lower the blood-sugar to well below the convulsive level (Olmsted and Logan).

On what particular detail in the chemical structure of the molecule the remarkable specificity of glucose in antidoting the symptoms may depend, cannot as yet be said, but it is evident that, by studying the relative antidoting value of various sugars and substituted sugars, we are furnished with an interesting method for determining the biological significance of the different side chains and of the other molecular arrangements of the glucose molecule.

The Pharmacological Assay of Insulin.

The extent to which insulin lowers the blood-sugar forms the basis for its pharmacological assay, one unit being originally defined by us as the amount which is required to lower it to 0·045 per cent. within four hours in a rabbit weighing 2 kg. and after 24 hours' fasting. Since convulsions supervene at this level, their occurrence can be used as a check on the assay, and when small animals, such as mice, are used, so that large numbers can be injected with varying amounts of insulin, it can be made by observing the onset of the symptoms alone. In this case one mouse unit is defined by A. Krogh as the quantity of insulin which can cause convulsions in 50 per cent. of the animals within two hours, precautions being taken to maintain the body temperature and to standardise the diet. Dale and Burn have also tried this method of assay.

Even when rabbits are carefully selected so as to correspond in weight and in every other particular, are similarly fed prior to the preliminary starvation period, and are injected intravenously so as to obviate any uncertainties in the rate of absorption, the assays as judged either by the blood-sugar curve or the occurrence of convulsions, do not always correspond. Differences in glycogen content, which can never be accurately adjusted, by dieting are probably largely responsible. We have attempted to circumvent these difficulties by confining the observations on the blood sugar to the first half hour after the insulin injections, hoping in this way to circumvent the influence of the glycogen reserves, but with no conspicuous success. Probably the most accurate method of assay is that worked out in Toronto by Dr. F. N. Allen on depancreated dogs. The principle of this method, which was suggested by our clinical associates, is to determine the number of grammes of glucose that a given quantity of insulin can cause to be metabolised while the animal is on a diet containing enough carbohydrate so that there is some glycosuria. He has found that the carbohydrate equivalent of insulin, as it is called, varies somewhat with the weight of the animal and the carbohydrate balance, but that is satisfactorily constant when these conditions are made uniform. It is not likely that this method will succeed in the clinic, because of the varying degree to which different diabetic patients retain the power to produce insulin.

I have said enough about this problem of assay to indicate how difficult it is, and I will not detain you further with detail. It is probably advisable to point out, however, that it has been found advantageous to adopt, for clinical purposes, temporarily at least, a unit which is one-third that of the standard unit as defined above. This is done to obviate the necessity of prescribing fractions of a unit for the treatment of mild cases of diabetes.

The Effect of Insulin in Experimental Hyperglycæmia.

Insulin also lowers the blood-sugar in every known form of experimental hyperglycæmia, whether this be produced by the addition of glucose exogenously or endogenously. With regard to the former type, Eadie has found that when insulin is injected into rabbits coinciding with, or at varying periods preceding the injection of sugar, the curve of the resulting hyperglycæmia becomes greatly altered. When the insulin injection coincides with that of sugar the curve rises to the same height as with sugar alone, but it returns much sooner to the normal level, and when the sugar is given some time after the insulin the curve is not only of shorter duration but is also much less in height. The maximal influence of insulin in suppressing the curve is when the sugar is given at an interval of about 75–90 minutes after the insulin. At longer intervals the curves progressively rise again, the suppressing influence of insulin having, as a rule, disappeared in about eight hours. We have attempted to use these facts as the basis for a method of assay, but with no great success.

Of the endogenous forms of experimental hyperglycæmia, we have studied the effect of insulin on those due to piqûre, to epinephrin, to asphyxial conditions, and to anæsthetics, and Stewart and Rogoff have studied it on the peculiar form due to morphine. The hyperglycæmia which becomes rapidly developed in glycogen-rich rabbits in all of these conditions is greatly depressed, if not entirely absent, in animals injected with insulin, this depending, obviously, on the amount injected. Most attention has been paid to epinephrin hyperglycæmia, because in this case alone is it possible to control the intensity of the hyperglycæmia by varying the dosage. This, it will be seen, offers a method for the assay of insulin, and Eadie has found, when equal quantities of epinephrin are injected into a series of uniformly fed rabbits along with varying quantities of insulin, that there is usually a definite mathematical relationship between the dose of insulin and the extent to which the blood-sugar rises.

Further interest attaches to the antagonistic action between insulin and epinephrin, with regard to the blood-sugar, because they are both hormones, although it is questionable whether the hormonic action of epinephrin is of importance to the animal. It is significant in this connexion that Stewart and Rogoff have found that the hypoglycæmic effect of insulin is not perceptibly different in adrenalectomised as compared with normal animals, thus showing that

the adrenals are in no way linked with the internal secretion of the pancreas in the control of sugar metabolism.

The observation that insulin can prevent the hyperglycæmia due to ether is of clinical importance, because it is probably on account of this hyperglycæmia that a large part of the risk of surgical operations on diabetic patients is due. It should be pointed out, however, that the hypoglycæmic action of insulin is much more readily demonstrated by having the animal well under the effects of insulin before the ether is administered, than by giving insulin to animals that are already anæsthetised. This would seem to indicate that diabetic patients should be treated with insulin before being anæsthetised, and, indeed, that this preliminary treatment should extend over several days so that the reserves of glycogen may be augmented. I am informed by my clinical colleagues that insulin is of little avail in combating post-operative coma if its administration is delayed until after the operation.

An interesting antagonism between pituitrin and insulin has been described by Burn. Given in large doses, pituitrin like insulin may inhibit the hyperglycæmia due to epinephrin or to ether, but when insulin and pituitrin are given together to normal animals, instead of there being a greater fall in blood-sugar than insulin alone would produce, there is little change or, it may be, a rise. A dose of pituitrin which in itself has little effect on blood-sugar is thus capable of neutralising the hypoglycæmic action of insulin. This observation has been confirmed by Logan and Olmsted, who have also found that it is necessary to give enormous amounts of insulin to cause any decided decrease in the hyperglycæmia which is present in decerebrate cats still retaining the pituitary gland. When this gland is absent, on the other hand, not only is the hyperglycæmia much less pronounced, as Bazett had suggested it would be, but insulin promptly lowers the blood-sugar and hypoglycæmic convulsions can readily be induced.

All of the forms of experimental hyperglycæmia just alluded to are primarily due to a rapid breakdown of the glycogen of the liver, and that produced by epinephrin may therefore be taken as a type. This does not, of course, warrant the assumption, that some have made, that a hypersecretion of this hormone is the underlying cause of the hyperglycæmia in the other forms. Indeed, Stewart and Rogoff have conclusively shown that such is not the case, with the possible exception of that caused by morphine. Taking epinephrin hyperglycæmia as a type, then, it seemed of interest to compare the amount of glycogen left in the livers of uniformly well-fed rabbits after they had been given equal doses of epinephrin, some of them at the same time also receiving insulin. This observation, made by E. C. Noble, has shown very definitely that the insulin protects the glycogen against breakdown. In one experiment, lasting eight hours, the livers of two animals receiving epinephrin alone contained 1·40 and 1·96 per cent. of glycogen, whereas those of three others which were given insulin along with the same amounts of epinephrin contained 8·12, 6·4, and 3·64 per cent. of glycogen. It is of interest to note that it was necessary to give about 40 times the usual dose of insulin to cause convulsions under these conditions, and that sometimes the convulsions occurred while there was still over 10 per cent. of glycogen remaining in the liver. The results show quite clearly that insulin antidotes the glycogenolytic action of epinephrin.

The Physiological Mechanism by which Insulin lowers the Blood-Sugar.

And now we are arrived at a stage where it will be advantageous to consider briefly the possible mechanism of the hypoglycæmic action of insulin. We have presented evidence that this is not because it stimulates increased glycolysis within the blood itself, and have concluded that insulin in some way lowers the tension of glucose in the tissue cells.

Further evidence that insulin causes the sugar to pass from the circulating fluid into the tissues more quickly than normal has been furnished by perfusion experiments on the isolated mammalian heart. Hepburn and Latchford, using Locke's method, found, as previous workers have, that an average of 0·9 mg. of glucose per gramme of (rabbit) heart per hour disappears from the perfusion fluid. By adding insulin to the perfusion fluid the average sugar consumption rose to over 3·0 mg., and in some cases reached the value of over 4·0 mg., the highest without insulin being below 2 mg. They did not find that insulin affected the heart-beat, nor could they detect any significant differences in the glycogen content of the hearts used in the two groups of experiments.

Hoping to be able to demonstrate a similar effect of insulin on the sugar content of fluid perfused through skeletal muscles, these workers attempted to perfuse the hind limbs of various laboratory mammals, but although every possible precaution was taken to avoid interruption of the circulation prior to starting the perfusion, or a fall in temperature, they could never succeed in preventing either marked œdema or vaso-constriction. This failure led them to compare the sugar concentration of blood removed at the same time from the femoral artery and vein, and from the portal vein, of anæsthetised or decerebrated animals, and to see whether insulin would cause the differences normally existing between these bloods to become changed. It was found not to do so. McCormack has since found that this method is also incapable of revealing an increased retention of glucose as a result of insulin, either in the muscles or in the liver of depancreated animals, in which, as we have seen, insulin certainly causes glycogen to be formed. This shows that the method is not sufficiently sensitive for the purpose for which it was employed.

The evidence of the observations on glycolysis and the perfused heart leave little doubt, however, that the glucose is lost in the tissue cells, and the problem narrows itself down to the cause for its disappearance. The possibilities that may be considered are: its polymerisation into glycogen, its oxidation, and its reduction to substances similar to fatty acids.

With regard to its possible conversion into glycogen, the fact that insulin causes large amounts of this polysaccharide to become deposited in the liver of depancreated animals when they are fed on carbohydrates would seem at first sight to lend support. But the conditions, as already pointed out, are fundamentally different in the normal organism. As a matter of fact, it has been shown that insulin given to normal rabbits, instead of causing glycogen to be deposited, has the opposite effect, and either prevents the deposition of glycogen when it is given along with carbohydrates to previously starved animals (McCormack and O'Brien), or causes the stores of this substance to become reduced when given to well-fed animals (Dale and Dudley).

Further evidence that insulin does not stimulate formation of glycogen in normal animals has been obtained by Noble by perfusion experiments on the liver of the turtle. When each of the two lobes is perfused for several hours with Ringer's solution containing glucose, under exactly similar conditions except that the fluid on one side contains insulin, the relative amounts of glycogen in the two lobes were found to be the same as they usually are. Since the normal variation may be considerable, the method is not a very delicate one, and on this account Noble has also used that of observing the sugar content of the perfusion fluid, as recommended by Snyder, Martin, and Levin. By comparing this for equal periods of time, with and without the addition of insulin, no differences could be detected. The only objection to the experiment is that insulin may not act quickly enough in the case of cold-blooded animals to make it possible in the time of perfusion for measurable quantities of glycogen to be deposited.

Clearly, therefore, none of the disappearance of sugar from the blood of normal animals which follows the injection of insulin can be accounted for by its

polymerisation to glycogen. Why, then, does insulin cause glycogen to be deposited in the diabetic animal, and why does it inhibit the breakdown of glycogen in experimental hyperglycæmia? The reply, based on the considerations already set forth, is that an excess of insulin beyond that actually required for the control of carbohydrate metabolism develops towards glycogen, an action which is the reverse of that which it has under normal conditions. When insulin is given to the diabetic animal, on the other hand, it supplies a previously missing agency necessary for the oxidation and polymerisation of glucose. To explain the retarding effect which insulin has on glycogen breakdown in experimental hyperglycæmia, we may suppose that the sugar which is produced by this process is a mixture of active and inactive forms, and that insulin, by tending to produce the former in relative excess, disturbs the balance existing between the sugars and glycogen, so that less glycogen is broken down. This suggestion assumes some sort of balanced action between glycogen and its hydrolytic products, for which, however, there is no experimental evidence.

The possibility that glucose disappears because excess of insulin causes its oxidation to be increased has been investigated by observing the respiratory exchange. In the experiments of Dixon, Eadie, and Pember, dogs and rabbits were used. In the former, the results show that insulin causes a very marked increase in oxygen consumption and in respiratory volume and rate, but very little change in the respiratory quotient. These changes do not, however, begin to be evident until from 30–60 minutes after giving the insulin, by which time the blood-sugar has completed its initial fall and stands at about 0·060 per cent., which indicates that the sudden call for sugar on the part of the tissue cells cannot be attributed to its increased oxidative breakdown. There can be little doubt that the increased metabolism is dependent upon the hyperexcitability and the increased muscular tone of the animal. It reaches its acme when convulsions supervene, and it develops either steadily or intermittently. Evidently, as the tension of glucose declines, conditions become established within the nerve centres which excite them and which may be dependent upon an intracellular lack of oxygen. That the development of the symptoms depends on the lowering of the glucose tension is supported by the observation that their severity is lessened by the injection of glucose.

In rabbits, in which it will be recalled increased muscular tone is not so marked a symptom as in dogs, the increase in oxygen consumption does not set in until the convulsions occur—indeed, there is often, if not usually, a drop both in this and in respiratory volume. Sometimes in rabbits the respiratory quotient rises decidedly. It would be rash at this stage to draw definite conclusions from these results, but it is quite plain that the initial fall in blood-sugar, which is primarily what we must attempt to explain, is not due to any increased combustion of glucose.

The remaining possibility that glucose is reduced to substances related to the fatty acids receives some support in certain of the observations from the behaviour of the respiratory quotient. This may rise to over unity without there being any sufficient degree of hyperpnœa, and of consequent "washing out" of CO_2 from the blood to account for it. To be quite certain of this latter possibility, Dixon and Pember have examined the blood removed from dogs at regular, frequent intervals after giving insulin without finding that there is any significant change in the CO_2-combining power. This observation, by the way, also shows that there can be no production of acid substances as a result of insulin, a fact which has also been demonstrated by F. N. Allen from observations on the behaviour of the acid excretion by way of the urine.

We are, therefore, at a loss to explain the cause for the initial disappearance of sugar from the blood; it is not converted into glycogen, its oxidation in the tissues is not augmented, at least until after increased muscular activity sets in, and if some of it does become reduced to fat-like substances this is not an invariable process.

The Source of Insulin in the Higher Animals.

The evidence that insulin is derived in the higher animals from the islets of Langerhans and not from the acinar (zymogenous) cells of the pancreas has, until recently, been of an indirect nature. Continuing the work of Diamare and Laguesse on the comparative anatomy of the islets of Langerhans, Rennie, in 1905, described in detail their relationship to that of the zymogenous tissue in numerous Teleostei. He found, particularly in *Lophius piscatorius*, Myoxocephalus, and the Pleuronectidæ, that the islet cells exist as separate encapsulated glands lying in the mesentery quite distinct and apart from the bulk of the zymogenous tissue, which is usually spread as narrow bands along the branches of the mesenteric blood-vessels. These glands he called principal islets, and he found the largest of them to be situated near the anterior pole of the spleen.

Although the more recently discovered methods of differential staining for islet cells have not been successfully applied to the principal islets, no one has doubted the conclusion of Diamare and Rennie that they are homologous with those of the islets of Langerhans of the mammalian pancreas. The absence of these structures in the zymogenous tissue in the Teleostei supports this view, as does also the fact that in the Elasmobranchi, in which there are no principal islets, the pancreas itself, which is a compact gland, contains abundant islet tissue. In collaboration with Fraser, Rennie investigated the effect of the principal islets, administered by mouth, on diabetic patients, but without results that could be considered to show definite amelioration of the symptoms. In one case an extract of the gland was injected subcutaneously, but the development of toxic symptoms made a repetition of the experiment inadvisable. In view of the now well-established fact that insulin is quite inactive when given by mouth, it is clear why these earlier observations should have failed to yield satisfactory results. Recently, we have reinvestigated the problem, and have found very definitely that alcoholic extracts of the principal islets cause a profound lowering of the blood-sugar of the normal and diabetic animals, including man, when they are injected subcutaneously or intravenously, whereas similarly prepared extracts of the zymogenous tissue have no such effect—indeed, not infrequently, rather cause the percentage of blood-sugar to increase. In contrast to these results, an extract of the pancreas of the skate, which contains islet tissue, has a marked insulin effect,[1] and so also had one prepared from the intercæcal fat of the trout (in which the islets and zymogenous tissue lie separately embedded). The islets are, therefore, the only source of insulin in the bony fishes, and we may conclude that they are also so in the mammals, since in them none of this hormone is produced after pancreatectomy.

This conclusion is supported by the experiments on duct ligation and on grafting already referred to, and by the experiments of Banting and Best, although in all of these there still remained the possibility that partially-degenerated or regenerated zymogenous tissue might be the source of the hormone.

Much attention has been given in recent years to the mechanism of the control of the secretion of glands producing internal secretions, and, since many of those concerned in the production of the external secretions are under nerve control, it has been supposed that this must also be the case with the ductless glands. It cannot be said, however, that much success has attended the various endeavours to demonstrate this nerve control. Since the islets of Langerhans are provided with a rich nerve supply, which is believed to come in large part from the right vagus, and since an increased discharge of their internal secretion, insulin, would be revealed by the behaviour of the

[1] These extracts have an unusually marked effect in causing violent convulsions.

blood-sugar. McCormack and O'Brien have investigated the effect which is produced on the latter by electrical stimulation of the right vagus, in decerebrate cats and in etherised dogs and rabbits. To avoid cardio-inhibitory effects, the nerve has either been stimulated below the origin of the cardiac fibres, or it has been allowed to undergo partial degeneration. The fact that hyperglycæmia follows stimulation of the great splanchnic nerve further suggests the possibility that hypoglycæmia might result from stimulation of the vagus.

Similar observations were made some years ago by de Corral working in Asher's laboratory, with results which are at least suggestive. Those of the present investigation are more definite, although not entirely convincing. In many cases no change can be detected in the level of the blood-sugar following the stimulation but in several others there is a prompt fall, which is usually of a temporary nature, in spite of continued stimulation. In one or two cases, however, stimulation with slow, weak induced shocks for a long period has caused a gradual decline in blood-sugar, in one case to 0·070 per cent., with a return towards the normal level after removal of the stimulus. It is of great interest in connexion with these experiments that Best and Scott have recently discovered that insulin can be prepared from blood by the usual methods.

The Chemical Reactions and the Preparation of Insulin.

Before concluding, allow me to say a few words concerning the methods used in the preparation of insulin and its chemical properties, in so far as these are known at present. The method of preparation developed by Collip depends on the solubility of insulin in concentrations of ethyl-alcohol up to about 90 per cent., above which it becomes precipitated. Since most proteins are insoluble at concentrations of alcohol that are considerably below this, they can be removed from the original extract of pancreas (which is made with 50-60 per cent. alcohol) by fractional precipitation after the extract has been concentrated by evaporation in vacuo. A watery solution of the precipitate which settles out at a concentration of 90 per cent. alcohol is insulin. It can be evaporated to dryness in vacuo without loss of potency, and the powder contains about 14 per cent. of nitrogen, is free from phosphorus (Doisy, Samogyi, and Shaffer), but contains sulphur. A solution gives a distinct biuret test, but only faintly, those of Millon and Hopkins-Cole. The insulin is readily absorbed by kaolin and charcoal, and considerable losses are apt to occur in passing it through a porcelain filter. It does not dialyse through membranes or collodion sacs; it is precipitated by half-saturation with ammonium sulphate, by barium salts of weak acids, and by picric acid. The solubility in water and alcohol is determined by the H-ion concentration, the iso-electric point being at a pH between 5 and 6. Watery solutions at a pH below 5 can be boiled for several hours without any loss in potency, but this occurs more rapidly when the pH is about 7. The potency quickly vanishes in the presence of pepsin or trypsin. In acid solution insulin is relatively stable to mild oxidising and reducing agents. Insulin is also soluble in phenol and the cresols, glacial acetic acid, and formamide. It is insoluble in most other organic solvents (Malony).

These reactions, and its destruction by pepsin and trypsin, suggest that insulin is of the nature of an albumose, but it is possible that it is really only adherent to this protein, and is itself of much simpler chemical structure. This view is supported by the fact that we have been unable on several occasions to detect any biuret reaction with insulin prepared from the pancreas of the skate or to obtain from this source precipitates containing it by means of high concentrations of alcohol, or by adjustment of the iso-electric point. Whether it is really a protein or not, it is significant that all the methods now used for its purification are based on reactions that are characteristic of colloids. Thus precipitation at the iso-electric point (Doisy, Samogyi, and Shaffer), or by picric acid followed by the regeneration from the picrate as a hydrochloride (Dudley), or by benzoic acid (Malony), or by half saturation with ammonium sulphate. It is highly creditable to those who have been responsible for producing insulin on a large scale for clinical use that they should have succeeded in so short a time in their work.

It may be assumed that insulin is present in all animals, and since structures similar to the islets of Langerhans have not been described in the invertebrates, it is likely that in them its site of production is delegated to other structures. What these may be in the more highly-developed invertebrates is as yet undetermined, but it is of interest that Collip, shortly after isolating insulin from mammalian pancreas, prepared it from clams, and suggested that it must be present wherever glycogen is found. Later he prepared a substance like it from yeast, thus confirming Winter and Smith. The insulin prepared from these sources appears to differ from that prepared from pancreas, in that its action in lowering the blood-sugar is delayed, sometimes for a day or so, which is also the case with an insulin-like substance prepared by Collip from various vegetable sources and styled by him, in recognition of these differences "glucokinin." Best and Scott have also succeeded in preparing insulin, or insulin-like substances, from various other sources. It would appear, therefore, that the distribution of hormones capable of accelerating the disappearance of glucose from the blood is widespread, not only in the animal kingdom but in the vegetable as well, but it is probable that these do not all have the same physiological action. In the investigation of this we must bear in mind that many substances have been known for long to be capable of lowering the blood-sugar; for example, peptone, hydrazin, certain mineral salts, phlorhizin, &c. All of these also cause glycogen to disappear from the liver, and, indeed, certain of them cause structural changes in this organ. Although it would certainly be desirable to have substances like glucokinin having a more prolonged action than insulin in depressing the blood-sugar, we must exercise some caution in recommending them for clinical use until it is certain that they have no deleterious effects on the liver. It is possible also that these substances merely stimulate the secretion of insulin from the pancreas of the animal into which they are injected, or serve as precursors for its production. If such be the case, then they can have little value in diabetes.

I have endeavoured in this review to adhere strictly to ascertained facts, and have refrained from venturing to speculate with regard to the numerous problems in metabolism, both of animals and plants, for the investigation of which insulin may prove a useful instrument. If I have succeeded in giving you a bird's-eye view, as it were, of the results that have been obtained, I shall consider that my efforts have not been in vain, and I shall feel repaid if, as an outcome, others join us in the work on insulin.

KING'S COLLEGE HOSPITAL FESTIVAL DINNER.—The Festival Dinner of King's College Hospital was held on July 17th at the Savoy Hotel, the Duke of Connaught in the chair. The Duke of Connaught, in proposing the toast of the hospital, spoke of the anxiety given by the present position of the London hospitals to those whose duty and privilege it was to conduct their work, and referred to the fact that King's College Hospital was the first that gave accommodation as a military hospital (No. 4 London General Hospital) during the war. During the time when the hospital was in military hands some 31,000 soldiers passed through its wards, together with 11,000 civilians; over 370 past and present members of the medical school, and over 150 trained nurses served with the forces. Unfortunately the war occurred at the time when the appeal for the new hospital was being made, and the building debt at the end of 1922 amounted to £73,000. He associated with the toast of the hospital the name of Viscount Hambleden, its chairman. Viscount Hambleden, replying, emphasised the value of the voluntary hospital system, and stated that during the past year the 5600 in-patients and 42,000 out-patients had themselves given £13,000 towards the cost of their maintenance. At the close of the proceedings the Duke of Connaught announced that £6000 had been subscribed during the evening.

Medical News.

UNIVERSITY OF LONDON.—A meeting of the Senate was held on June 18th, the Vice-Chancellor, Mr. H. J. Waring, being in the chair. Regulations were adopted for the degree of Bachelor of Dental Surgery for external students. Grants were made out of the Thomas Smythe Hughes Medical Research Fund for the year 1923–24 as follows: 1. To Dr. Evelyn E. Hewer, D.Sc., and Mrs. Lucas Keene, M.B., B.S., jointly, £100 for an investigation of the human fœtus with a view to establishing the normal development of organs, their normal microscopical structure at all ages of development, the scope of "physiological" variations, and the effects of various abnormal factors. 2. To Dr. H. M. Woodcock, D.Sc., £50 for an investigation in the study of blood-digestion by tissue-cells along histological lines; especially at the present time, in connexion with the increased development of the mammary gland during pregnancy and the formation of milk.

The Committee of the medical members of the Senate have re-elected Mr. Raymond Johnson to be their chairman for 1923–24.

At examinations held recently the following candidates were successful:—

M.D. EXAMINATION.

Branch I., Medicine.—Archibald G. Duncan, London Hosp.; Robert Ellis, Birmingham University and St. Bart.'s Hosp.; David M. Lloyd-Jones, St. Bart.'s Hosp.; and Olive Rendel, London (R.F.H.) Sch. of Med. for Women.

Branch III., Psychological Medicine.—Philip C. P. Cloake (University Medal), London Hosp.

Branch IV., Midwifery and Diseases of Women.—Thomas G. D. Bonar, Guy's Hosp; Mariamne O. Ramsay, London (R.F.H.) Sch. of Med. for Women; and Philip J. Veale (University Medal), Univ. Coll. Hosp.

Branch V., State Medicine.—Eric W. C. Thomas, St. Bart.'s Hosp.

Branch VI., Tropical Medicine.—Gordon Covell, Guy's Hosp. and London Sch. of Trop. Med.

M.S. EXAMINATION.

Branch I., Surgery.—Michael W. B. Bulman, London Hosp.; and Esther Rickards, St. Mary's Hosp.

UNIVERSITY OF MANCHESTER.—At examinations held recently the following candidates were successful:—

THIRD M.B., CH.B. EXAMINATION.

Pathology.—R. S. Adam, J. H. Anderson, J. K. Barr, C. V. Brown, Stella H. Brown, H. H. Bullough, Margaret A. Bromhall, W. C. V. Brothwood, T. A. Brown, Elsie Catlow, William Chadwick, S. F. Clegg, Geoffrey Coope, Jenny D. Craig, Joseph Crowther, J. A. Crowther, A. F. C. Davey, T. E. Davies, Stanley Devine, Kathleen Dickinson, Florence M. Duckworth, Reginald Ellis, R. A. Ferguson, C. R. Fielding, Miriam Florentin, A. G. Forbes, J. B. Fulton, J. W. Graham, Philip Gregory, James Haslam, G. H. Hayle, A. H. Heyworth, Edward Holmes, Winifred L. Horton, J. N. Hudson, Elizabeth G. Humble, E. P. Johnson, P. G. Johnson, Phyllis I. Kaufmann, David Kemp, Barbara M. Knight, G. F. Langford, E. M. Liddle, Hilda M. Linford (with distinction), F. R. Lockhart, A. M. Macgill, G. H. March, Ethel Morris, William Mottershead, Alice M. Orrell, R. M. Pearce, Henry Penman, Samuel Pope, L. J. Prosser (with distinction), Albert Riley, T. W. Rothwell, B. R. Sandiford, Eileen Sheehan, Joseph Shlosberg, H. T. Simmons, John Sims, A. B. Slack, G. S. Smith, A. R. Somerford, Lois Stent, R. F. Stubbs, James Troup, H. M. Turner, C. L. Walker, Ronald Walshaw, S. E. Ward, Samuel Whalley, Hugh Whittle, Charles Wilcocks, R. M. Williams, Geoffrey Williamson, S. P. Wilson, K. K. Wood, P. B. Wood, Frank Yates, J. M. Yoffey, and N. A. J. Young.

Pharmacology.—Louise Aronovitch, H. K. Ashworth, Marion L. Bainbridge, A. R. Barber, C. H. Bamford, J. R. Beal, R. H. Blackburn, N. W. Bolton (with distinction), Lilian Bond, G. H. H. Booth, Kathleen M. Boyes, Marguerite E. Cliff, John Crook, T. A. Danby, R. S. Davidson, A. A. Davis, N. E. Delaney, Harriet M. Dick, Florence M. Duckworth, L. F. Evans, Leo Fay, S. J. Firth, Beatrice N. Fletcher, Harris Galley, Riad Girgis, J. S. Goller, Mary Harburn, Barnett Hirsh, G. D. Hithersay, J. L. Holt, R. L. Holt, John Hunt, May Johnson, Walter Johnson, G. W. Jones, T. J. Kay, J. T. C. Keddie, James Kemp, H. B. Kilroe, J. H. Kitson, Annie E. Mackintosh, E. A. Marson, W. D. Mitton, G. S. de W. Moll, S. L. Mucklow, R. J. Owen, Archer Pearson, Harry Pigott, R. H. Poyser, Joan Robinson, M. R. Sagar, N. F. Seed, Raphael Shaffer, W. H. Shepley, W. S. Slater, Agnes G. Smiley, F. H. Smirk (with distinction), Jane B. Stubbs, J. K. Thomas, Olive de la W. Turner, J. C. Wilson, and Reginald Wood.

The following awards have been made:—Platt Physiological Scholarship: E. C. Smith. Dauntesey Medical Scholarships: First, A. H. Baker; second, R. Newton. Graduate Prize in Medicine: L. J. Witts. Sidney Renshaw Prize in Physiology: R. Whitehead. Dumville Surgical Prize: L. J. Witts. University Prize in Medicine: Kathleen Sheehan.

UNIVERSITY OF PARIS.—A holiday course of post-graduate instruction in diseases of children will be held at the medical clinique of the Hôpital des Enfants Malades, 149, Rue de Sèvres, Paris, from August 20th to Sept. 8th inclusive, under the direction of Prof. P. Nobecourt and Mr. P. Lereboullet.

ROYAL SANITARY INSTITUTE.—As announced last week, the thirty-fourth Congress of the Institute, together with an exhibition of apparatus and appliances relating to public health, will take place at Hull from July 30th to August 4th, under the presidency of the Rt. Hon. T. R. Ferens, High Steward of Hull.

ROYAL COLLEGE OF PHYSICIANS, EDINBURGH.—The Dr. Jessie MacGregor Prize in Medical Science (50 gs.) for the present triennial period has been awarded by the trustees to Miss May Laurie Walker, M.B., Ch.B. Edin., of the Department of Physiology in the University of Edinburgh, for her record of work on the anatomy and physiology of the depressor nerve.

PAYMENT OF PANEL DOCTORS IN CHESHIRE.—At a meeting of the Cheshire Insurance Committee held on July 19th a discussion took place on the Medical Benefits Subcommittee's recommendation that in future the capitation system of remuneration of insurance practitioners in Cheshire be discontinued in favour of payment by attendance. The committee decided by 19 votes to 7 to pay on the attendance system in the future.

SCOTTISH BOARD OF HEALTH: PRECAUTIONS AGAINST SMALL-POX.—Regulations have been issued making chicken-pox compulsorily notifiable in Scotland until the end of the year. This step is taken because of the possibility of the introduction of small-pox into this country. The Board have suggested to the local authorities that they should ask the medical practitioners in their district to seek the coöperation of the medical officer of health in dealing with any illness that has even a remote resemblance to small-pox.

REGULATIONS FOR LABELLING DRIED MILK.—It is announced that the Minister of Health is about to make regulations as to the labelling and composition of dried milk on the lines of the regulations recently made with regard to condensed milk. The regulations will come into operation on Jan. 1st, 1924, and will apply to all dried milk intended for sale for human consumption in England and Wales. Copies of the draft Regulations, which have been prepared for this purpose, can be purchased under the description "Draft of the Public Health (Dried Milk) Regulations, 1923" from H.M. Stationery Office, Imperial House, Kingsway, W.C. 2, price 2*d*. Any representations on the subject should be addressed to the Secretary to the Ministry at an early date.

PEOPLE'S LEAGUE OF HEALTH.—At a recent meeting between representatives of the Trades Union Congress General Council and a deputation from the Medical Council of the People's League of Health, the proposal that the machinery of the League shall be utilised for the health education of the workers of the country was discussed. Among those present were Sir Alfred Fripp, Sir Frederick Mott, Sir Harry Baldwin, Prof. C. S. Myers, Dr. Jane Walker, and Miss Olga Nethersole.

Introducing the deputation, Sir Alfred Fripp asked that a resolution should be included in the agenda of the Trades Union Congress to be held at Plymouth next September calling the attention of the delegates to the need for health education, and to the offer of the People's League of Health to act as the official health educational channel. Sir Frederick Mott pointed out that while education on bodily health was increasing steadily, that which affected mental health was almost entirely neglected. The asylums of the country were full to overflowing with cases of insanity that might have been prevented if the necessary measures had been taken in time. Sir Harry Baldwin said that much disease was caused through the neglect of the teeth, and one of the commonest causes of bad teeth was incorrect diet. Dr. Jane Walker said that a *small* deviation from good health should be regarded as of equal importance with a large one. For instance, a slight loss of weight and general listlessness might be the earliest symptoms of consumption. Prof. Myers said that health education was not only necessary from the employers' point of view, but actually meant larger profits. If a factory was losing money it meant inefficiency somewhere. In nine cases out of ten that inefficiency was caused through the workers not being properly cared for. Insufficient light, insufficient leisure, insufficient air, and anything else that had an adverse effect on health made workers sullen and discontented, and resulted in a diminished output. Miss Olga Nethersole, the founder and hon. organiser of the League, suggested that all patients under the panel system should submit themselves for medical and dental examination at least twice a year.

Parliamentary Intelligence.

HOUSE OF LORDS.

THURSDAY, JULY 19TH.

Smoke Abatement.

The Earl of ONSLOW introduced a Bill the object of which is to amend the law relating to smoke abatement. The Bill was read a first time.

Therapeutic Substances Bill.

Lord ONSLOW also introduced a Bill entitled the Therapeutic Substances Bill, to provide for the regulation of the manufacture, sale, and importation of certain vaccines, sera, and other therapeutic substances. The Bill was read a first time.

Sale of Liquor to Children.

Viscount ASTOR, in moving the second reading of the Intoxicating Liquor (Sale to Persons under Eighteen) Bill, which has passed through the House of Commons, denied that it was a class measure or that it was a step towards prohibition. He pointed out that Sir Thomas Horder, a prominent member of the Anti-Prohibition League and a distinguished member of the medical profession, together with three other distinguished physicians and surgeons, wrote to the *Times* supporting the Bill and urging its passage. He claimed that there was behind the Bill an overwhelming measure of public support.

Lord DAWSON OF PENN said that he would have been more happy if he had heard from Lord Astor one word of grudging approval of alcohol for people of any class whatever. One could not shut one's eyes to the fact that quite a large proportion of the people who supported this Bill were people who looked upon alcohol as a harmful thing in itself and therefore specially harmful for youths and adolescents. Alcohol was without doubt a food, but that it was a good and effective food in health no sensible person would contend, whatever it might be in sickness. His own view and that of others was that alcohol was a stimulant, though only for a transient period. Its chief effect was on the nervous system. Anyone who referred to it as a narcotic was a scientific philistine, and either his personal experience had been unfortunate or they might console themselves with a thought that after he had called it a narcotic he might presently be seen at home enjoying a glass of old port. To call alcohol a narcotic was a misnomer. In excess it might be a narcotic, but in moderation it added to the pleasure, the exhilaration, the happiness, and the gaiety of life. In the conditions of modern civilisation, in these days of concentration with the constant endeavour to put 12 hours into six, the higher measure of specialisation in modern employment, it was obvious that at the end of such a day the mind of a man got into one track. It was there that the value of alcohol came in. In moderation it got the man out of the track, lightened his mental touch, and enabled him to travel from one topic to the other. He happened to be at a public dinner not very long ago when the centre table consisted almost entirely of prohibitionists, among them several high ecclesiastics of the Church. It was the one dull grey spot in the whole of that dinner, and if anyone wished to be converted to an uncompromising condemnation of prohibition they would have been converted by that scene. There were a number of people who at the end of a fatiguing day were quite unable to digest their food because their nervous system was too tired. A small quantity of alcohol made them happy with themselves and happy with the world. In the particular phase of civilisation we were passing through there had been no time when alcohol, properly taken in proper quantities and in moderation, could serve a more useful purpose. The second effect of alcohol —namely, narcotism—followed in youth very much more quickly than in adult years. The argument for this Bill was that youth did not require alcohol; if it got into one track it got out of it quickly—sometimes too quickly. If the true uses of alcohol were more readily recognised by reformers their influence would be considerably greater. An enormous deal depended on the quality of alcohol. They might take alcohol in absolute purity and dilute it and drink it, and they would get effects totally different from those which followed drinking a good glass of wine or beer. They might submit the samples to analysis, and they would find no difference between the one and the other. The qualities of good wine and beer were due to traces of unponderable substances which might be compared to vitamins in food. The whole good effect of alcohol depended on moderation. He thought it would be universally admitted that moderation was progressing by leaps and bounds. He had got out the figures of a large hospital in London for ten years, and he selected two diseases which were exclusively produced by alcohol. In 1900 there were 39 cases of sclerosis of the liver admitted into that hospital; in 1920 there were seven. He then selected an alcohol disease peculiar to women, and he found for 1900 there were 19 such cases and in the year 1920 only one. Take all the diseases due to alcoholism in that hospital per 1000 of the male patients. In the year 1900 there were 5 per 1000, in 1910 4 per 1000, and in 1920 under 1 per 1000. It seemed to him only logical that they should protect youth from alcohol, and with that *caveat*, that this Bill did not carry with it any condemnation of alcohol as such, he supported its provisions. The second reading of the Bill was agreed to.

HOUSE OF COMMONS.

WEDNESDAY, JULY 18TH.

Grants to Local Authorities.

THE House went into Committee on the Expiring Laws Continuance Bill, Captain Fitzroy in the chair.

Mr. WILLIAM WATSON said that the duties of medical officers and sanitary inspectors had increased very considerably during the period of the war and since. Quite a number of Acts of Parliament had been passed increasing those duties, with the result that the salaries of these officials had been increased during the past few years. By the Local Government (Emergency Provisions) Act, 1916, the grants given by the Government were stereotyped and they stood at the same figure to-day as they did in 1915, and he appealed to the Government to strike this provision out of this Bill so that the local authorities in Scotland might get the relief to which they were entitled.

Captain ELLIOT (Parliamentary Under-Secretary of Health for Scotland) said that by dropping this provision in the present Bill, as suggested by the hon. Member, they would not increase the sum allocated to Scotland for payment of grant-in-aid of rates. The question of grants in relief of local rates was under consideration by an estimates committee, and he had every hope that this was the last year that they would bring forward a provision of this kind.

Coroners and Juries.

Lieut.-Commander KENWORTHY moved to omit Section 7 of the Juries Act, 1918, as amended by 12 and 13 Geo. 5, c. 2. This section gave power to a coroner to dispense with a jury altogether. It therefore lay with the coroner to suspect murder or manslaughter. He suggested that the coroner might not be seized of all the circumstances.

Sir KINGSLEY WOOD said he would like to see the old jury system reverted to because he thought it was one of the best features of English law.

Mr. F. GRAY said that under the Coroners Act of 1887 the coroner had considerable power in determining whether there should or should not be an inquest in a particular case. He had always been impressed by the fact that a large percentage of the cases in which inquests were held were in respect of poor people and workers. The reason was two-fold. First, it was only when an inquest was held that the doctor who had been called in was able to get the substantial fee of 2 guineas for conducting the post-mortem examination, with an additional guinea for attending to give evidence at the inquest. The second reason was that in a large number of cases where a sudden death occurred in the house of a well-to-do person it was notorious that very considerable pressure was brought to bear on the coroner to induce him to abstain from having the unpleasant publicity of an inquest. The power conferred by the Act of 1887 in this respect was probably too wide. When an inquest was held and a jury was called together, if it served no other purpose, it brought publicity to bear on the matter in hand.

Mr. G. LOCKER-LAMPSON (Under-Secretary to the Home Office) agreed that this was a very important question. The section under review was, however, put down originally as a war measure in order to avoid having to summon more people than was necessary. It had been found very useful, had saved a great deal of expense, had worked perfectly smoothly, and had given general satisfaction to the public. The coroner had not to take power to dispense with a jury unless the circumstances of the case justified it. He thought that that was really a sufficient safeguard so far as this temporary measure was concerned. He believed that a promise had already been made that legislation was going to be introduced to consolidate and amend the law relating to coroners, and when the time came an amendment of this particular Section 7 of the Act of 1918 would be very carefully considered.

After further discussion the amendment was negatived by 214 votes to 157.

Visit of Distinguished Russian Scientist.

Mr. RILEY asked the Under-Secretary of State for Foreign Affairs if he was aware that the distinguished Russian scientist, Pavlov, invited to attend the Edinburgh Congress on Physiology, had been refused the visa to his passport by the British consul in New York, and what was the reason or reasons for such refusal.—Mr. LOCKER-LAMPSON (Under-

Secretary for the Home Office) replied: My right hon. friend has no information as to the refusal of a visa to Prof. Pavlov in New York. I understand, however, that he has already sailed from America, and no obstacle will be placed in the way of his landing in this country to attend the Congress on Physiology at Edinburgh.

Milk-feeding Experiments.

Mr. HURD asked the Minister of Health whether he could state in general terms the results of the milk-feeding experiments among Birmingham council school-children, showing the physiological value of fresh milk as an article of diet, and particularly the effect on children suffering from malnutrition of the addition to their dietary of a pint of fresh milk daily, and whether he would cause to be prepared and published a report on the experiments for the encouragement of coöperative movements of the same kind between other educational, agricultural, and health authorities.—Mr. NEVILLE CHAMBERLAIN replied: It would not be possible within the limits of an answer to a question in this House to state even in general terms the results of the experiments referred to in the first part of the question. As regards the second part, I think the question of publishing a report on the results of these experiments is a matter for the authority responsible for the investigation. I may add that the Ministry of Health, in conjunction with the Medical Research Council, are conducting investigations into the nutritive properties of milk in the feeding of children, and the question of issuing a report on these investigations will be considered.

Poor-Law Officers' Superannuation.

Mr. HAYDAY asked the Minister of Health whether he was aware that an employee in a fever hospital paid for superannuation under the provisions of the Poor-Law Officers Act; that if for any reason the employee was transferred to a mental hospital, even if it was controlled by the same authority, he came under the Asylum Officers Act for superannuation purposes; that as there were no provisions in either Act for transfer value the employee lost credit for all the payments he made under the Poor-Law Officers Act although if he were dismissed instead of transferred he would get his payments returned, and whether he would take action to bring these two Acts into conformity with the provisions of the Local Government and other Officers Superannuation Act, 1922.—Mr. NEVILLE CHAMBERLAIN replied: I am aware of the difficulty to which the hon. Member refers, but I am afraid I cannot promise to introduce legislation dealing with the matter at the present time.

Houses under the New Bill.

Captain WEDGWOOD BENN asked the Minister of Health the number of houses approved for construction to date under the new Bill.—Mr. NEVILLE CHAMBERLAIN replied: The number of houses approved to date which will rank for assistance under the new Bill is 16,215.

Small-pox Commissioners.

Mr. ALBERT BENNETT asked the Minister of Health the number of small-pox commissioners appointed at present in the country and the districts in which they were operating, and what were their duties and the degree of coördination they observe with respect to the medical advisers of local authorities.—Mr. NEVILLE CHAMBERLAIN replied: There appears to be some misapprehension as to the nature of the arrangements to which the hon. Member refers. These arrangements have been made solely with a view to securing promptly an accurate diagnosis in suspected cases of small-pox. In ordinary circumstances, if the doctor in attendance upon a patient and the local medical officer of health are doubtful whether the case is one of small-pox, arrangements are made if possible for one of the medical officers of my department who have special experience in the diagnosis of the disease to see the patient in consultation with the practitioner and the medical officer of health. The recent outbreaks of small-pox have rendered it necessary that some further assistance should be available for the diagnosis of doubtful cases, and I have secured the services of 12 medical men residing in different parts of the country, each of whom has special knowledge and experience of small-pox, to visit suspected cases when assistance is sought from my department and the services of medical officers of the Ministry are not immediately available. The sole object of these visits is to assist in diagnosis, and the medical men who have been appointed endeavour in each case to arrange to see the patient in consultation with the medical attendant and the local medical officer of health.

THURSDAY, JULY 19TH.

Medical Boards and Final Awards.

Mr. WHITELEY asked the Minister of Pensions whether, seeing that out of 13,023 cases heard by the assessment appeal tribunal in the six months ending Dec. 31st, 1922, the assessment was increased in 2500 cases and the final award set aside in 2500 cases, he would issue instructions to the members of final award boards that in arriving at their decisions every regard must be paid to the prospective condition of men suffering from a temporary or permanent disablement due to war service, and whether he would withdraw Supplement No. 3*b* to M.P.M.S.D. 57, informing the boards that they were expected to make final awards.—Major TRYON replied: The medical boards concerned have already been instructed in the sense suggested by the hon. Member in the first part of his question. I am not prepared to adopt the suggestion in the last part of the question. The instruction referred to was issued in the interests of disabled men for the reasons which I stated in the course of debate on Committee of Supply on the 5th ultimo.

Allowances for Home Treatment.

Mr. HERRIOTTS asked the Minister of Pensions whether, in all cases where a pensioner was recommended home treatment with allowances, the recommendation was referred to a deputy commissioner of medical services; whether he had power to veto such recommendations; whether any record was kept of the number of cases where authority to pay allowances is refused; and, if so, would he give the number of men who were recommended home treatment with allowances but did not receive allowances in the three months ending March 31st.—Major TRYON replied: Certificates given by Ministry institutions and clinics are not referred to a deputy commissioner of medical services, but where the examination has been conducted by an out-station medical officer his recommendation is referred to a deputy commissioner. The latter never disturbs a recommendation of allowances without personally seeing the man unless the examining medical officer agrees, on reconsideration of the case, that allowances are not admissible. I regret that the figures asked for are not available, as no record is kept of these decisions other than in the man's personal file.

Medical Commissioner and the Welsh Language.

Mr. ROBERT JONES asked the Minister of Pensions whether the deputy commissioner of medical services (tuberculosis), Wales region, was attached to the South-Western region; whether he had any knowledge of the Welsh language; and, if not, whether he would consider the appointing of an officer able to speak the language of the country in which he had to carry out his duties.—Major TRYON replied: The answer to the first part of the question is in the affirmative. I have no definite knowledge of this officer's acquaintance with the Welsh language, but as he has been performing his duties satisfactorily I assume that he has had no difficulty in understanding and making himself understood by pensioners in the Principality.

Dental Inspection in Wales.

Mr. ROBERT JONES asked the Minister of Pensions whether the deputy commissioner of medical services (dental) as part of his duties had to satisfy himself by personal examination as to the quality of the work done by each dentist; how many dentists were there on the dental panel for Wales; how many dentures did the deputy commissioner of medical services (dental) examine in the 12 months ending March 31st, 1923; and in how many cases was the work unsatisfactory.—Major TRYON replied: The answer to the first part of the question is in the affirmative. Recent figures are not available, but during the year ended November, 1922, this officer examined personally 494 individual cases where dental treatment was provided, a considerable proportion of which had to be referred back for further treatment or for adjustment. There are about 60 dentists on the panel in Wales.

Panel Doctors and Treatment Allowances.

Mr. ROBERT MORRISON asked the Minister of Pensions for what reason the Ministry refused to grant treatment allowances on the certificate of a man's panel doctor that the man was unable to work.—Major TRYON replied: Treatment allowances are payable only when a medical officer of the Ministry is satisfied that the nature of an approved course of treatment is such as to prevent the man from providing for his own support and that of his family. Full consideration is always given to any opinion expressed by the panel doctor on the requirements of any treatment approved.

Insane Prisoners.

Sir ROBERT NEWMAN asked the Secretary of State for the Home Department whether he could state how many persons during the last four years had become insane and been certified as such while undergoing terms of imprisonment; whether any of them had died in that condition before being released from custody; and how many convicted persons during the last four years had committed suicide while serving a sentence of imprisonment.—Mr. BRIDGEMAN replied: The number of convicted, debtor, and surety prisoners certified insane in prison during the last four years is 432. None of these persons died while still in prison and before removal to an asylum. I have no information as to

how many of these persons died before they were discharged from asylums. During the same four years 28 prisoners committed suicide in prison.

Nurses and Registration.

Dr. CHAPPLE asked the Minister of Health whether he could state the number of nurses who had applied for registration under the Nurses Registration Act, 1919, up to July 14th, 1923; and whether existing nurses would be eligible for registration if otherwise qualified, should their applications be received within a period of two years from the date on which the recent order came into operation.—Lord EUSTACE PERCY replied: I am informed that up to July 14th 40,436 applications had been received. After this date the council have no power to admit applications for registration as an existing nurse, and the reply to the second part of the question is, therefore, in the negative.

FRIDAY, JULY 20TH.

Small-pox at Brockworth Aerodrome.

Mr. RHYS DAVIES asked the Minister of Health whether any of the patients at the Brockworth aerodrome had actually died as a result of small-pox and, if so, what were their ages; whether they were vaccinated either before or after reaching the aerodrome; and how long had they been at the aerodrome.—Mr. NEVILLE CHAMBERLAIN replied: So far as I am aware, there have been three deaths among small-pox patients at the Brockworth aerodrome. The first was an unvaccinated man, 58 years of age, who died, five days after admission, as a result of cerebral hæmorrhage and delirium tremens whilst suffering from a mild attack of small-pox. The second was an unvaccinated child, 6 weeks of age, who died from small-pox seven days after admission to hospital. The third was an unvaccinated child, 10 months of age, whose death, 12 days after admission to hospital, was due to small-pox, complicated by enteritis and heart failure.

MONDAY, JULY 23RD.

Mortality from Small-pox.

Mr. LUNN asked the Minister of Health what was the annual mortality per 1,000,000 living from small-pox at ages under 15 years for the periods 1861–70, 1871–80, 1881–90, 1891–1900, 1901–10, and 1911–20.—Mr. NEVILLE CHAMBERLAIN replied: These particulars are only available for the usual age groups for ages under 15—viz., 0–5, 5–10, 10–15—shown in the table below:

	0–5	5–10	10–15
1861–70	638	145	56
1871–80	518	285	138
1881–90	80	33	26
1891–1900 ..	29	10	3
1901–10	22	7	6
1911–20	0·57	0·32	0·11

Pernicious Anæmia.

Sir ROBERT NEWMAN asked the Minister of Health whether he possessed any statistics concerning deaths from a complaint known as pernicious anæmia; if so, whether he could state if the deaths arising from that complaint had considerably increased of late years; and whether a considerable number had occurred among ex-Service men.—Mr. NEVILLE CHAMBERLAIN replied: Separate figures in regard to pernicious anæmia are not available for years prior to 1920, but as the bulk of the deaths included under the heading anæmia are due to pernicious anæmia, the figures in the following table may be of use. Figures are not available for ex-Service men as a whole, but I am informed by the Ministry of Pensions that as regard ex-Service men pensioned for injuries or disabilities, 152 out of a total of 60,000 deaths were due to pernicious anæmia.

Death-rate per Million Living.

—	Anæmia.		Pernicious anæmia.		Other forms.	
	Males.	Females.	Males.	Females.	Males.	Females.
1911	48	60	—	—	—	—
1912	49	63	—	—	—	—
1913	54	65	—	—	—	—
1914	56	72	—	—	—	—
1915*	69	75	—	—	—	—
1916*	69	74	—	—	—	—
1917*	74	74	—	—	—	—
1918*	69	60	—	—	—	—
1919	57	71	—	—	—	—
1920	61	71	55	62	6	9
1921	62	84	55	74	7	10
1922	68		61	74	7	10

* The figures for the years 1915–1918 are based on the civilian population.

TUESDAY, JULY 24TH.

The Army Medical Service.

Mr. BECKER asked the Under-Secretary of State for War if, in view of the unpopularity of the Army Medical Service at the present time, he would recommend that young medical men should be invited to serve three, five, or seven years, with a gratuity at the end of service, so as to maintain a steady flow of young men into the Service.—Lieut.-Colonel GUINNESS replied: It is already open to army medical officers to retire with gratuity after eight and a half years' service. I do not think the shortening of this period is desirable, or administratively practicable, having regard, for instance, to the requirements of the army in India.

Small-pox at Gloucester Aerodrome.

Mr. LEACH asked the Minister of Health whether he would arrange for photographs to be taken of half a dozen of the most representative cases of small-pox at the Gloucester aerodrome, so that medical officers could be made familiar with the symptoms of the disease that was diagnosed as small-pox to-day.—Lord E. PERCY replied: I understand that photographs of some of these cases have already been taken, but I am advised that a study of such photographs would not be of much assistance to medical men in the differentiation of symptoms of small-pox.

Appointments.

GIMBLETT, C. L., M.D. Camb., M.R.C.P. Lond., F.R.C.S. Eng., has been appointed Hon. Ophthalmic Surgeon to the Royal Northern Hospital.

SOUTHAM, A. H., M.D., M.Ch. Oxon., F.R.C.S.Eng., Assistant Surgeon, Manchester Children's Hospital.

Vacancies.

For further information refer to the advertisement columns.

Bristol, Cossham Memorial Hospital, Kingswood.—H.S. £120.
Cardiff Royal Infirmary.—Two Hon. Dental Surgs.
Carmarthenshire Education Committee.—Chief School M.O. £700.
Cumberland County Council.—Asst. County M.O.H. £500.
Devonport, Royal Albert Hospital.—H.S. £150.
Durham County Hospital.—H.S. £200.
Earlswood, Royal Earlswood Institution.—Med. Supt. £800.
East African Medical Service.—M.O. £600.
Exeter, Royal Devon and Exeter Hospital.—H.P. £150.
Exminster, Devon Mental Hospital.—Third Asst. M.O. £300.
Federated Malay States, Central Mental Hospital.—Asst. Med. Supt. £616.
Finsbury Dispensary, Brewer-street, Goswell-road, E.C.—S. £50.
Freemasons Hospital and Nursing Home, 237, Fulham-road, Chelsea, S.W.—Res. M.O. £250.
Hospital of St. John and St. Elizabeth, 40, Grove End-road, N.W.—Radiologist. 50 guineas.
Inverness, Northern Infirmary.—H.S. £120.
Jamaica, Clarendon Parochial Board.—M.O.H. £600 to £800.
Leeds Public Dispensary.—Sen. Res. M.O. £200.
London Hospital, E.—First Asst. to each of the Surgical Firms. £400.
Manchester, Baguley Sanatorium.—Third Asst. M.O. £400.
Manchester, Monsall Fever Hospital.—Jun. Med. Asst. £405 6s.
Manchester, St. Mary's Hospitals for Women and Children.—Asst. M.O. £100.
Mid-Wales Counties Mental Hospital, Talgarth, Breconshire.—Med. Supt. £800.
Prince of Wales's General Hospital, N.—Asst. M.O. in Venereal Dept. £150.
Rotherham Hospital.—Sen. H.S. £260. Jun. H.S. £150.
Royal Free Hospital, Gray's Inn-road, W.C.—Sen. Res. M.O. £150.
Royal Naval Medical Service.—Surgeon-Lieutenants.
St. Helens County Borough.—Asst. M.O.H. £500.
Salvation Army Mothers' Hospital, Clapton.—Sen. Res. Med. Woman.
Swansea General and Eye Hospital.—Asst. Pathologist. £400.
West African Medical Service.—M.O. £660.
Windermere, Ethel Hedley Hospital for Crippled Children.—H.S. £150.
Wrexham Borough.—M.O.H. £700.

Births, Marriages, and Deaths.

BIRTHS.

NEWHAM.—On July 17th, to Marjorie (née Auden), M.R.C.S., L.R.C.P., wife of W. B. Turner Newham, A.R.I.B.A., of Waterkloof, Pretoria—a son.

DEATHS.

MAJOR.—On July 15th, at a nursing home in London, George William Major, M.D., of Montreal, Canada.
WHITE.—On July 18th, at 7, Cliff-terrace, Margate, Edward Alexander White, M.D., aged 70 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

TYPHUS FEVER EPIDEMIC AMONG THE GREEK REFUGEES.

BY SIR PATRICK HEHIR, K.C.I.E., C.B., C.M.G., M.D. BRUX., F.R.C.S., F.R.C.P. EDIN.,
MAJOR-GENERAL, I.M.S. (RET.): MEDICAL ADVISER, BRITISH RED CROSS SOCIETY IN GREECE.

(*Continued from p. 153.*)

The Municipal Hospital, Salonica.

THE remarks with which I terminated the first part of my article do not apply to all refugee typhus hospitals; some are decidedly superior. The best organised and worked infectious diseases hospital I have come across in Greece is that at Salonica under the local municipality. It is a hutted hospital arranged in groups of elongated wooden blocks well lighted and ventilated. It can accommodate 500 patients; it had under treatment on May 14th 149 cases. These included 86 typhus fever, 30 relapsing fever, 6 smallpox, 23 erysipelas, 2 enteric, 1 paratyphoid A, 1 scarlet fever. The staff consists of 3 medical officers, 15 nurses, and 23 male sick attendants. The whole work of the hospital, which deals exclusively with refugees, is of as high a standard as can be expected in connexion with the medical care of refugees. It was opened on Dec. 6th, 1922, and up to May 14th, 1923, had admitted 275 cases of typhus fever, of whom 16 died, a mortality of 5·8 per cent., the lowest on record in Greece. Of the staff 6 have been attacked, including the médecin en chef, 2 nurses, and 3 male sick attendants; all recovered. It is noteworthy that the infected nurses and sick attendants were employed in the delousing department of the hospital and not in the wards.

Period of Incubation.

Forty years or so ago 12 days used to be given as the period of incubation of typhus. All recent experience of the disease in Russia and Greece shows this to be still literally correct. It has been proved by the inoculation of infective human blood experimentally into man and monkeys.[1] It seems probable that the dose of the virus introduced into man initially may affect not only the severity of the disease but also the period of incubation. Medical officers in Greek hospitals treating typhus acquired by sick attendants, nurses, and doctors hold this view, and we have some grounds for supporting it from the cases treated in our own refugee typhus ward in Athens. Kusama has shown that if monkeys receive the minimum infective dose, the period of incubation will be lengthened and the fever will be of shorter duration and milder.

Clinical History.

Normally the onset is gradual. A generation or so ago a sudden and violent beginning was laid down as one of the specific features distinguishing typhus from typhoid. There are the usual indications of a commencing pyrexia, such as malaise, a tired feeling, headache, and anorexia. In a few days the face is somewhat flushed, conjunctiva injected, expression dull; tongue coated, lips and mouth dry; thirst, constipation, pain in the back and limbs are complained of; headache is severe. By the time the patient is brought to hospital (vide infra) there is, as a rule, no doubt about the diagnosis. By the fifth day the mucous membranes are often implicated in the rash, the tongue is thickly coated with a white fur and it becomes dry; later it is cracked and fissured; the mouth becomes offensive and sordes collect on the teeth, although these conditions can, to a certain extent, be prevented by careful nursing. Diarrhœa may set in at this time, and if intractable is an unfavourable symptom. On the other hand, as stated, constipation may be present and tempt the physician to administer aperients, the effects of which may be difficult to control.

The rash usually appears about the end of the fourth day, but at that time requires to be carefully looked for on the outside and front of the arms, on the chest, abdomen, shoulders, back, and hips. It comes out as small ovoid or round slightly raised pink or roseolar spots. On the fifth day the eruption is well marked, and among the red spots will be found some maculæ which do not fade on pressure. After this petechial patches may be formed. On the eighth or ninth day the eruption is decidedly petechial and has a multiform character—roseolar patches, red spots, maculæ or small petechiæ, and large plaques typically petechial. The eruption may vary, however, from faint pink roseolar spots to large ecchymosed patches. In a well-marked case by the sixth day the eruption cannot be mistaken for that of any other disease; it is well seen on the outer surface of the arms and forearms, shoulders, back and lower part of the abdomen, and on the hips. If the hands are affected the palms often escape, while the dorsal surface is covered with maculæ. In about 1 per cent. of the typhus cases seen in Greece there is either no eruption or only a faint roseolar one; this is more frequently the case in children and adolescents; in these the Weil-Felix reaction is present. By the end of the second week little is left of it. I was specially impressed by the absence of eruption on the face in cases where it almost covered the rest of the body. Nevertheless, there appeared to be a characteristic facies, with a reddish ring around the eyes about half an inch in diameter, and a similar but fainter ring round the mouth. These rings, with the injected conjunctiva, cracked lips and a dull, apathetic, semi-drunken expression, with much prostration, seemed to me to give the patient a very distinctive appearance. In some cases the general lousiness antecedent to the onset of the disease has led to considerable skin irritation with scratching and local secondary infections, which may initially be rather puzzling. In three large infectious diseases hospitals I visited several times the cases are as a rule admitted on the fifth day; the eruption is in the large majority of typhus cases already fairly developed.

Delirium.—Delirium, often noisy, is a common symptom about the end of the first week, but it soon acquires a low muttering character. Different phases of the mental state may be met with in a large ward of typhus cases. In a ward containing 30 patients which I visited one patient had just been retrieved after running out of hospital; another was attempting to run downstairs, two were shouting, in several there was a muttering delirium; some were dying, others were recovering consciousness, and so on. The whole picture was most melancholy.

Pulse and Temperature.—The pulse during the first week in uncomplicated cases runs from 85 to 100 per minute; it is losing tension. During the second week it is from 110 to 115. The comparatively slow pulse of 90 to 100 per minute with a high temperature is a normal phenomenon in moderately severe cases up to the beginning of the critical period, ninth to the fourteenth day, when it rises to 110 or even to 120–130. The temperature rises gradually, and by the end of the third day reaches 104° or 105° F. After reaching the maximum there is no great diurnal variation, the figure usually being a degree lower in the morning. The gradual rise is a useful guide to the diagnosis in the pre-eruptive stage, and differs from the regular "step-ladder" ascent of enteric. I came across several cases with temperatures between 103° and 106°, but none with real hyperpyrexia. A rapid fall of the temperature to the neighbourhood of 100°, in conjunction with the progressive rise in the pulse-rate, is an unfavourable sign. Increasing asthenia and muscular debility are always present; patients can scarcely move in bed; they are often unable to protrude the tongue, and lose all expression. Emaciation in some cases towards the end of the disease is most marked; to see a group of convalescents in most refugee typhus hospitals after moderately severe typhus, where proper feeding and massage have been neglected, reminds one of the cases of chronic starvation seen in famine camps in India. That it is not an inevitable consequence of the disease was seen in at least two hospitals, in one of which (Salonica) there was only one case of moderate emaciation among 32 convalescents. In a small proportion of cases there is a definite single crisis; in most cases there is lysis, but a mixture of these, beginning with a lysis and ending in a crisis, or the reverse, may take place. A true crisis is the most satisfactory termination, and leads to a fairly speedy convalescence; a definite and prolonged lysis is usually the forerunner of a long-continued convalescence.

In the above account of symptoms I have only given in general terms the ordinary course of moderately severe cases seen in the British Red Cross Hospitals and in Greek hospitals associated with our work. As with most other epidemic infectious diseases, cases vary considerably in severity. Some are so mild that the patients neither come to hospital nor take to their beds, and continue to move about as if nothing is the matter with them; the part such cases take in the epidemic need not be emphasised. Others brought to hospital at the end of the fifth day or later are so overwhelmed with the effects of the virus that they die in a day or to.

Diagnosis.

The general practitioner sometimes seems to find difficulty in accurately diagnosing some cases of typhus in the early stage. This is the experience of all the infectious diseases hospitals in Greece. I was informed by medical officers in charge of two large infectious diseases hospitals in and near the capital that about 8 per cent. of their cases are initially wrongly diagnosed, and that they continue to receive cases of influenza and relapsing fever, measles, and other diseases as typhus, while 3 per cent. of cases diagnosed as typhus turn out to be other diseases. Typhus is sometimes combined with

[1] Kusama: THE LANCET, 1921, ii., 386.

other infectious diseases; I have seen three in which it ran concurrently with relapsing fever, proved by the coexistence of a typical typhus rash and *S. obermeieri* in the blood. Relapsing fever is the disease over which the greatest number of mistakes is made in all hospitals. In relapsing fever the *sudden* onset with rapid rise of temperature, severe headache, pains in the back and extremities, absence of dullness and apathy, and (ordinarily) of rash, the presence of a moist tongue, and of *S. obermeieri* in the blood, and, later in the disease, more or less anæmia, should be sufficiently distinctive. In the Salonica Hospital the records show that in eight cases typhus and relapsing fever ran their course concurrently in the same cases, and that so far as could be observed neither disease affected the course of the other; the only change noticed was that during a relapse the fever ran up a degree or so; nor did the cases assume a graver type, although the usual complications of typhus occurred. The use of neosalvarsan for the recurrent fever did not affect the normal progress of the typhus. The combined infection seems to suggest that the same louse may be able to carry *S. obermeieri* and the virus of typhus and inoculate them at the same time. This is a point worth investigation. In many typhus and influenza ran together, the latter disease being also epidemic at the time. In one infectious diseases hospital, where they admitted several hundred cases of both small-pox and typhus, the medical officers told me that they had not met a single instance in which the two diseases occurred in patients at the same time, although in one typhus followed the small-pox, probably from infection acquired in the hospital.

Weil-Felix Reaction.—This reaction in typhus is very distinctive. Its nature is described in all modern works on the disease. It owes its origin to the discovery of the fact that what are called the "X" strains of *B. proteus* are agglutinated by the serum of typhus cases. The special strains that do this are X 2 and X 19; these were primarily obtained from typhus urine. The reaction is similar to that of Widal in enteric; the macroscopic method is here usually adopted. The minimum dilution accepted as positive is 1 to 100. Practically, the serum of the vast majority of typhus fever cases after the eighth day is positive, whilst that of other fevers is negative. The *Journal of the Royal Army Medical Corps* for July, 1920, contains a clear account of this reaction and its technique. In three cases without eruption, diagnosed as typhus, the reaction proved positive; the subsequent course of the disease bore out the diagnosis. Several senior physicians of large hospitals in Greece assured me that they place implicit reliance on this test. It is certainly most useful in mild cases without eruption and in cases running an aberrant course.

The most reliable and complete records of the Weil-Felix reaction I have had the opportunity of reviewing are those of the Salonica Infectious Diseases Hospital. This reaction was employed from the date of opening the hospital, Dec. 6th, 1922, and includes the particulars of 275 cases of typhus. From the data collected I ascertained certain facts. The reaction is not present until the sixth day. Two nurses and three male sick attendants at the hospital were attacked. In each of these the patient was seen from the first day of the fever and the test applied daily; in none did it appear before the sixth day, and in all it appeared on the sixth day. Of the 86 cases in hospital on May 14th, 1923, the reaction appeared on the sixth day in 23; in others it appeared on the seventh, eighth, ninth, and tenth days; in two it was not present until the lysis started; in one it was first met with on the last day of the fever. In one of the 275 cases it did not occur at all, not even in 1–20 dilution; the case was characteristically typhus. In this series the reaction was absent in 0·36 per cent. of cases. A certain number of typhus cases give a positive Widal reaction in 1–20, but it remains stationary at that point, whereas the Weil-Felix test becomes more pronounced daily, usually reaching its acme at 1–800 on the twelfth to the fourteenth day.

Macroscopically the Weil-Felix presents much the same characters as the Widal in enteric, with the same variations in rapidity of clumping. When well marked, the scattered dead micro-organisms of *B. proteus* move like a living thing to form a striking mass in the typhus serum. In one of two cases of typhoid, and in one of paratyphoid A, I saw the Weil-Felix reaction well marked in 1–20; they had remained stationary at that for a week, whereas the specific Widal in each case was progressively rising. None of the relapsing fever cases gave the Weil-Felix reaction except when the disease was associated with typhus.

(To be continued.)

A DIRECTORY OF BART.'S MEN.

THE Year Book of the St. Bartholomew's Hospital Students' Union appears again after an interval of nearly ten years. The last edition was dated April, 1914. This useful "little red book" contains a brief account of the Students' Union and its various athletic and social clubs, with an alphabetical list of present students. It also contains a directory, both alphabetical and topographical, of Bart.'s men in practice, with a request that any errors or omissions should be notified to the editor of the Year Book. The cost of publication is chargeable to the Students' Union, and the Bart.'s men to whom it has individually been sent are asked to remit the modest sum of 1*s.* to help in defraying the expenses. Such hospital directories have a value in keeping present and past members of a great school in touch with one another.

A BOOK FOR LAYMEN ON HEART FAILURE.

A SERIES entitled "Harvard Health Talks" is designed "to provide modern and authoritative information on medical subjects," and a recent volume[1] in the series embodying the substance of some public lectures delivered at the Harvard Medical School admirably fulfils this object as regards heart failure. The writer is to be congratulated on having expressed so lucidly in such a small space the main facts of the present-day conception of this subject. A short sketch of the "arterio-sclerotic" and "rheumatic" forms of heart disease is followed by a reference to the importance of syphilis and other types of infection. Attention is called to the frequency with which the presence of a heart lesion is revealed accidentally in the course of a routine examination and the importance of preventive and remedial measures is discussed. There is a small mistake on p. 13, in reference to the coronary arteries, which requires correction. Lectures such as these will help to interest the public in the prevention of heart disease and so enlist their coöperation in the eradication of a cause of economic wastage which the writer holds to be even more important than tuberculosis.

[1] The Causes of Heart Failure. By William Henry Robey, Assistant Professor of Medicine in Harvard University; Visiting Physician to the Boston City Hospital. Cambridge: Harvard University Press. London: Humphrey Milford, Oxford University Press. 1922. Pp. 45. 4*s.* 6*d.*

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY, July 30th.—10 A.M., Mr. Maingot: Surgical Pathology. 2 P.M., Mr. Addison: Surgical Wards. 3 P.M., Mr. Simson: Diseases of Women.

TUESDAY.—11 A.M., Dr. McDougal: Electrical Dept. 12 noon, Dr. Burrell: Chest Cases. 2.30 P.M., Mr. Tyrrell Gray: Surgical Wards.

WEDNESDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 11 A.M., Mr. Simson: Gynæcological Demonstration. 3 P.M., Dr. Pernet: Skin Dept.

THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Dept. 2 P.M., Mr. MacDonald: Genito-Urinary Dept. 3 P.M., Dr. Scott-Pinchin: Medical Out-patients.

FRIDAY.—10 A.M., Mr. Dudley Buxton: Dental Dept. 3 P.M., Mr. Sinclair: Surgical Out-patients.

SATURDAY.—9.30 A.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations on Throat, Nose, and Ear.

Daily, 10 A.M. to 6 P.M. Saturdays 10 A.M. to 1 P.M. In-patients, Out-patients, Operations, Special Departments.

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